### 1

#### Comprehensive immigration reform is going to pass – obama’s political capital is key to build trust with the GOP

Kiefer, 2-6 – Staff writer for CSM (Francine, “Immigration reform: Boehner says it's down to a matter of 'trust' (+video)” http://www.csmonitor.com/USA/DC-Decoder/2014/0206/Immigration-reform-Boehner-says-it-s-down-to-a-matter-of-trust-video)djm

Immigration reform, long stalled in the US House, is coming down to this: Republicans don't trust President Obama to enforce immigration laws and won't act on new legislation until that trust gap narrows. On Thursday, House Speaker John Boehner (R) of Ohio said that distrust is “one of the biggest obstacles” to getting reform done. “There's widespread doubt about whether this administration can be trusted to enforce our laws," he said. "And it's going to be difficult to move any immigration legislation until that changes.” Democrats dubbed this new focus on "trust" a dodge to get around the fact that Boehner can't control his fractious caucus. But some close observers of Congress's difficult and protracted struggle over immigration debate see some promise in this turn in the debate. For the first time in a very long time, policy differences are not at the heart of the immigration dispute – at least among many Republicans in the House, where immigration reform hit a wall after the Senate passed a bipartisan bill last year. In an aside, Mr. Boehner commented Thursday that Republicans “by and large” support principles that he released at a private GOP retreat for House members a week ago. Both the president and key Democrats in the House have expressed openness to the principles, which allow for a path to legal status for some 11 million undocumented immigrants in America, but no “special” path to citizenship. That said, the trust issue is a mountainous obstacle, depending on whose trust the president needs to win. If “trustees” include the faction of Republicans who will never agree to immigration reform, who dislike Mr. Obama so intensely that they can’t bring themselves to support anything he supports, then, no, he is unlikely to ever win their trust. But if it refers to the Republican leadership – and if it is the leadership that is driving reform in the House – it is not mission impossible, according to some observers. “Certainly, some Republicans, no matter what, say ‘We can’t trust this guy and we can’t negotiate with him.’ But they’re not the head of the party and they’re not the kingmaker,” says Lanae Erickson Hatalsky, director of social policy and politics at Third Way, a moderate Democrat think tank. She, and others, can think of several ways that Mr. Obama can respond on the trust front. Hold the line on deportations. The president is under tremendous pressure to ease up on deportations, even stop them altogether, especially given his State of the Union emphasis on using executive orders, when necessary, when Congress fails to act. But the president has so far held the line on these anti-deportation demands. There may be no better way to show that he’s enforcing the law than by reminding Congress that he’s doing that now in the face of huge pressure. Keep working on the personal. Trust gets built through personal relationships – and as America has learned by now, schmoozing is not this professor-in-chief’s strong point. As Ms. Erickson Hatalsky points out, he may not be able to build relationships with the “backbenchers” but he can at least improve them with Republican leaders in the House. “He’s begun to do that,” she said, and if there is continued progress on issues such as a noneventful raising of the debt ceiling, that could continue.

#### New renewables funding is horribly unpopular – the GOP wants cuts, not increases

**Abrams 13** – Jim Abrams is a writer for Associated Press, (“Renewable Energy Budget Cut In Half In House Republicans' Spending Bill”, 07/11/13, http://www.huffingtonpost.com/2013/07/10/renewable-energy-budget\_n\_3575842.html)// ACJS

WASHINGTON -- House Republicans are proposing to slash money for renewable energy research and defy the Obama administration's decision to close the Yucca Mountain nuclear waste repository in a bare-bones annual spending bill for energy and water programs. The House could vote late Wednesday on the legislation. The bill has little support in the Democratic-led Senate and faces a White House veto, but makes clear just how far apart the two parties are on policy and budgetary matters. The bill would approve $30.4 billion for Energy Department programs, including nuclear weapons maintenance, almost $3 billion below the amount approved last year. It would cut spending for renewable energy programs by half.

**Immigration reform expands skilled labor—spurs relations and economic growth in China and India.**

**LA Times** 11/9/**12** [Other countries eagerly await U.S. immigration reform, <http://latimesblogs.latimes.com/world_now/2012/11/us-immigration-reform-eagerly-awaited-by-source-countries.html>]

"Comprehensive immigration reform will see expansion of skilled labor visas," predicted B. Lindsay Lowell, director of policy studies for the Institute for the Study of International Migration at Georgetown University. A former research chief for the congressionally appointed Commission on Immigration Reform, Lowell said he expects to see at least a fivefold increase in the number of highly skilled labor visas that would provide "a significant shot in the arm for India and China." There is widespread consensus among economists and academics that skilled migration fosters new trade and business relationships between countries andenhances links to the global economy, Lowell said. "Countries like India and China weigh the opportunities of business abroad from their expats with the possibility of brain drain, and I think they still see the immigration opportunity as a bigger plus than not," he said.

**US-Indian relations avert South Asian nuclear war.**

**Schaffer 2** [Spring 2002, Teresita—Director of the South Asia Program at the Center for Strategic and International Security, Washington Quarterly, Lexis]

Washington's increased interest in India since the late 1990s reflects India's economic expansion and position as Asia's newest rising power. New Delhi, for its part, is adjusting to the end of the Cold War. As a result, both giant democracies see that they can benefit by closer cooperation. For Washington, the advantages include a wider network of friends in Asia at a time when the region is changing rapidly, as well as a stronger position from which to help calm possible future nuclear tensions in the region. Enhanced trade and investment benefit both countries and are a India. For India, the country's ambition to assume a stronger leadership role in the world and to maintain an economy that lifts its people out of poverty depends critically on good relations with the United States.

### 2

#### **The affirmatives paranoid securitized approaches to politics result in a drive for certainty that can never be reconciled - orthodox IR’s atomistic approach to global problems makes extinction inevitable and descionmaking impossible**

Ahmed 12 Dr. Nafeez Mosaddeq Ahmed is Executive Director of the Institute for Policy Research and Development (IPRD), an independent think tank focused on the study of violent conflict, he has taught at the Department of International Relations, University of Sussex "The international relations of crisis and the crisis of international relations: from the securitisation of scarcity to the militarisation of society" Global Change, Peace & Security Volume 23, Issue 3, 2011 Taylor Francis

3. From securitisation to militarisation 3.1 Complicity

This analysis thus calls for a broader approach to environmental security based on retrieving the manner in which political actors construct discourses of 'scarcity' in response to ecological, energy and economic crises (critical security studies) in the context of the historically-specific socio-political and geopolitical relations of domination by which their power is constituted, and which are often implicated in the acceleration of these very crises (historical sociology and historical materialism). Instead, both realist and liberal orthodox IR approaches focus on different aspects of interstate behaviour, conflictual and cooperative respectively, but each lacks the capacity to grasp that the unsustainable trajectory of state and inter-state behaviour is only explicable in the context of a wider global system concurrently over-exploiting the biophysical environment in which it is embedded. They are, in other words, unable to address the relationship of the inter-state system itself to the biophysical environment as a key analytical category for understanding the acceleration of global crises. They simultaneously therefore cannot recognise the embeddedness of the economy in society and the concomitant politically-constituted nature of economics. Hence, they neglect the profound irrationality of collective state behaviour, which systematically erodes this relationship, globalising insecurity on a massive scale - in the very process of seeking security.85 In Cox's words, because positivist IR theory 'does not question the present order [it instead] has the effect of legitimising and reifying it'.86 Orthodox IR sanitises globally-destructive collective inter-state behaviour as a normal function of instrumental reason -thus rationalising what are clearly deeply irrational collective human actions that threaten to permanently erode state power and security by destroying the very conditions of human existence. Indeed, the prevalence of orthodox IR as a body of disciplinary beliefs, norms and prescriptions organically conjoined with actual policy-making in the international system highlights the extent to which both realism and liberalism are ideologically implicated in the acceleration of global systemic crises. By the same token, the incapacity to recognise and critically interrogate how prevailing social, political and economic structures are driving global crisis acceleration has led to the proliferation of symptom-led solutions focused on the expansion of state/regime military-political power rather than any attempt to transform root structural causes.88 It is in this context that, as the prospects for meaningful reform through inter-state cooperation appear increasingly nullified under the pressure of actors with a vested interest in sustaining prevailing geopolitical and economic structures, states have resorted progressively more to militarised responses designed to protect the concurrent structure of the international system from dangerous new threats. In effect, the failure of orthodox approaches to accurately diagnose global crises, directly accentuates a tendency to 'securitise' them - and this, ironically, fuels the proliferation of violent conflict and militarisation responsible for magnified global insecurity. 'Securitisation' refers to a 'speech act' - an act of labelling - whereby political authorities identify particular issues or incidents as an existential threat which, because of their extreme nature, justify going beyond the normal security measures that are within the rule of law. It thus legitimises resort to special extra-legal powers. By labelling issues a matter of 'security', therefore, states are able to move them outside the remit of democratic decision-making and into the realm of emergency powers, all in the name of survival itself. Far from representing a mere aberration from democratic state practice, this discloses a deeper 'dual' structure of the state in its institutionalisation of the capacity to mobilise extraordinary extra-legal military-police measures in purported response to an existential danger. The problem in the context of global ecological, economic and energy crises is that such levels of emergency mobilisation and militarisation have no positive impact on the very global crises generating 'new security challenges', and are thus entirely disproportionate.90 All that remains to examine is on the 'surface' of the international system (geopolitical competition, the balance of power, international regimes, globalisation and so on), phenomena which are dislocated from their structural causes by way of being unable to recognise the biophysically-embedded and politically-constituted social relations of which they are comprised. The consequence is that orthodox IR has no means of responding to global systemic crises other than to reduce them to their symptoms. Indeed, orthodox IR theory has largely responded to global systemic crises not with new theory, but with the expanded application of existing theory to 'new security challenges' such as 'low-intensity' intra-state conflicts; inequality and poverty; environmental degradation; international criminal activities including drugs and arms trafficking; proliferation of weapons of mass destruction; and international terrorism.91 Although the majority of such 'new security challenges' are non-military in origin - whether their referents are states or individuals - the inadequacy of systemic theoretical frameworks to diagnose them means they are primarily examined through the lenses of military-political power.92 In other words, the escalation of global ecological, energy and economic crises is recognised not as evidence that the current organisation of the global political economy is fundamentally unsustainable, requiring urgent transformation, but as vindicating the necessity for states to radicalise the exertion of their military-political capacities to maintain existing power structures, to keep the lid on.93 Global crises are thus viewed as amplifying factors that could mobilise the popular will in ways that challenge existing political and economic structures, which it is presumed (given that state power itself is constituted by these structures) deserve protection. This justifies the state's adoption of extra-legal measures outside the normal sphere of democratic politics. In the context of global crisis impacts, this counter-democratic trend-line can result in a growing propensity to problematise potentially recalcitrant populations - rationalising violence toward them as a control mechanism. Consequently, for the most part, the policy implications of orthodox IR approaches involve a redundant conceptualisation of global systemic crises purely as potential 'threat-multipliers' of traditional security issues such as 'political instability around the world, the collapse of governments and the creation of terrorist safe havens'. Climate change will serve to amplify the threat of international terrorism, particularly in regions with large populations and scarce resources. The US Army, for instance, depicts climate change as a 'stress-multiplier' that will 'exacerbate tensions' and 'complicate American foreign policy'; while the EU perceives it as a 'threat-multiplier which exacerbates existing trends, tensions and instability'.95 In practice, this generates an excessive preoccupation not with the causes of global crisis acceleration and how to ameliorate them through structural transformation, but with their purportedly inevitable impacts, and how to prepare for them by controlling problematic populations. Paradoxically, this 'securitisation' of global crises does not render us safer. Instead, by necessitating more violence, while inhibiting preventive action, it guarantees greater insecurity. Thus, a recent US Department of Defense report explores the future of international conflict up to 2050. It warns of 'resource competition induced by growing populations and expanding economies', particularly due to a projected 'youth bulge' in the South, which 'will consume ever increasing amounts of food, water and energy'. This will prompt a 'return to traditional security threats posed by emerging near-peers as we compete globally for depleting natural resources and overseas markets'. Finally, climate change will 'compound' these stressors by generating humanitarian crises, population migrations and other complex emergencies.96 A similar study by the US Joint Forces Command draws attention to the danger of global energy depletion through to 2030. Warning of ‘the dangerous vulnerabilities the growing energy crisis presents’, the report concludes that ‘The implications for future conflict are ominous.’97 Once again, the subject turns to demographics: ‘In total, the world will add approximately 60 million people each year and reach a total of 8 billion by the 2030s’, 95 per cent accruing to developing countries, while populations in developed countries slow or decline. ‘Regions such as the Middle East and Sub-Saharan Africa, where the youth bulge will reach over 50% of the population, will possess fewer inhibitions about engaging in conflict.’98 The assumption is that regions which happen to be both energy-rich and Muslim-majority will also be sites of violent conflict due to their rapidly growing populations. A British Ministry of Defence report concurs with this assessment, highlighting an inevitable ‘youth bulge’ by 2035, with some 87 per cent of all people under the age of 25 inhabiting developing countries. In particular, the Middle East population will increase by 132 per cent and sub-Saharan Africa by 81 per cent. Growing resentment due to ‘endemic unemployment’ will be channelled through ‘political militancy, including radical political Islam whose concept of Umma, the global Islamic community, and resistance to capitalism may lie uneasily in an international system based on nation-states and global market forces’. More strangely, predicting an intensifying global divide between a super-rich elite, the middle classes and an urban under-class, the report warns: ‘The world’s middle classes might unite, using access to knowledge, resources and skills to shape transnational processes in their own class interest.’99 Thus, the securitisation of global crisis leads not only to the problematisation of particular religious and ethnic groups in foreign regions of geopolitical interest, but potentially extends this problematisation to any social group which might challenge prevailing global political economic structures across racial, national and class lines. The previous examples illustrate how secur-itisation paradoxically generates insecurity by reifying a process of militarization against social groups that are constructed as external to the prevailing geopolitical and economic order. In other words, the internal reductionism, fragmentation and compartmentalisation that plagues orthodox theory and policy reproduces precisely these characteristics by externalising global crises from one another, externalising states from one another, externalising the inter-state system from its biophysical environment, and externalising new social groups as dangerous 'outsiders\*. Hence, a simple discursive analysis of state militarisation and the construction of new "outsider\* identities is insufficient to understand the causal dynamics driving the process of 'Otherisation'. As Doug Stokes points out, the Western state preoccupation with the ongoing military struggle against international terrorism reveals an underlying 'discursive complex", where representations about terrorism and non-Western populations are premised on 'the construction of stark boundaries\* that 'operate to exclude and include\*. Yet these exclusionary discourses are 'intimately bound up with political and economic processes', such as strategic interests in proliferating military bases in the Middle East, economic interests in control of oil, and the wider political goal of 'maintaining American hegemony\* by dominating a resource-rich region critical for global capitalism.100 But even this does not go far enough, for arguably the construction of certain hegemonic discourses is mutually constituted by these geopolitical, strategic and economic interests — exclusionary discourses are politically constituted. New conceptual developments in genocide studies throw further light on this in terms of the concrete socio-political dynamics of securitisation processes. It is now widely recognised, for instance, that the distinguishing criterion of genocide is not the pre-existence of primordial groups, one of which destroys the other on the basis of a preeminence in bureaucratic military-political power. Rather, genocide is the intentional attempt to destroy a particular social group that has been socially constructed as different. As Hinton observes, genocides precisely constitute a process of 'othering\* in which an imagined community becomes reshaped so that previously 'included\* groups become 'ideologically recast' and dehumanised as threatening and dangerous outsiders, be it along ethnic, religious, political or economic lines — eventually legitimising their annihilation.102 In other words, genocidal violence is inherently rooted in a prior and ongoing ideological process, whereby exclusionary group categories are innovated, constructed and 'Otherised' in accordance with a specific socio-political programme. The very process of identifying and classifying particular groups as outside the boundaries of an imagined community of 'inclusion\*, justifying exculpatory violence toward them, is itself a political act without which genocide would be impossible.1 3 This recalls Lemkin's recognition that the intention to destroy a group is integrally connected with a wider socio-political project - or colonial project — designed to perpetuate the political, economic, cultural and ideological relations of the perpetrators in the place of that of the victims, by interrupting or eradicating their means of social reproduction. Only by interrogating the dynamic and origins of this programme to uncover the social relations from which that programme derives can the emergence of genocidal intent become explicable. Building on this insight, Semelin demonstrates that the process of exclusionary social group construction invariably derives from political processes emerging from deep-seated sociopolitical crises that undermine the prevailing framework of civil order and social norms; and which can, for one social group, be seemingly resolved by projecting anxieties onto a new 'outsider' group deemed to be somehow responsible for crisis conditions. It is in this context that various forms of mass violence, which may or may not eventually culminate in actual genocide, can become legitimised as contributing to the resolution of crises.105 This does not imply that the securitisation of global crises by Western defence agencies is genocidal. Rather, the same essential dynamics of social polarisation and exclusionary group identity formation evident in genocides are highly relevant in understanding the radicalisation processes behind mass violence. This highlights the fundamental connection between social crisis, the breakdown of prevailing norms, the formation of new exclusionary group identities, and the projection of blame for crisis onto a newly constructed 'outsider' group vindicating various forms of violence.

#### The alternative is to deterritorialize the 1AC through a historical and critical lens – rather than objectively approaching their threat discourse, we choose more diverse forms of analysis

**Krause and Williams 97** (Keith Krause, professor of political science at the Graduate Institute on International and Development Studies, Michael C Williams, professor of international relations at the Graduate School of Public and International Affairs, “From Strategy to Security: Foundations of Critical Security Studies,” chapter 2 of Critical Security Studies, p 49-50)

The challenges to the conventional understanding of security and the object to be secured also necessitate an epistemological shift in the way security is to be understood and studied. What is involved is a shift in focus from abstract individualism and contractual sovereignty to a stress on culture, civilization, and identity; the role of ideas, norms, and values in the constitution of that which is to be secured; and the historical context within which this process takes place. Epistemologically, this involves moving away from the objectivist, rationalist approach of both neorealism and neoliberalism, and toward more interpretive modes of analysis. While these issues have gained some prominence in debates over the nature of regime theory and the study of international organizations, they have made little impact on security studies.51 This is clearly illustrated by Helga Haftendorn’s attempts to broaden the ambit of security studies. On method, she concludes that the goal of security studies is “to construct an empirically testable paradigm,” which involves defining the “set of observational hypotheses,” the “hard core of irrefutable assumptions,” and the “‘set of scope conditions’ that…are required for a ‘progressive’ research program.” Although she admits that “we might do well to follow [Robert] Keohane’s counsel to apply somewhat ‘softer,’ more interpretive standards,” there is little room in this approach for studying norm change and the role of ideational elements in *constituting* the historical context within which actors take specific decisions.52 Despite Haftendorn’s goal of incorporating new issues that are normatively driven, the subordination of normative and reflexive conceptions of agency to objectivist visions of method remains largely undisturbed, and she remains committed to the fact value distinction. To understand security from a broader perspective means to look at the ways in which the objects to be secured, the perceptions of threats to them, and the available means of securing them (both intellectual and material) have shifted over time.53 New threats emerge; new enemies are created; erstwhile fellow citizens become objects of hatred and violence; former enemies can be transformed into members of the same community. The status of Others is uncertain, needing to be deciphered and determined.54 To comprehend these processes requires an understanding of the problematics of security as constituted by self-reflexive historical practices. The knightly code of honor, for example, was both a central structuring practice of latemedieval conflict and a central object that was to be secured. Honor was an integral part of conflict in its genesis as well as its practice. To view the military conflict of the late-medieval world as a competition between instrumentally rational actors in the modern sense is to misunderstand it in both form and content.55 The shift to interpretive models of understanding (broadly conceived) also yields a different vision of the transformation of practices. As historically grounded, the practices of security become capable of conscious transformation through the process of critical reflection. No longer objective in the sense of a fixed reality that the analyst can only mirror, reality as the realm of subjective practices and structures becomes self-reflexive. This is most emphatically not to say that security studies needs to move away from studying the role of ideas, institutions, and instruments of organized violence in political life. In this respect, the continuing defenders of traditional strategic/security studies are correct (although this formulation will probably leave them uncomfortable). But if we are to understand these realities, we must take them more seriously than the abstractions of neorealism allow. We must grasp the genesis and structure of particular security problems as grounded in concrete historical conditions and practices, rather than in abstract assertions of transcendental rational actors and scientific methods. We must understand the genesis of conflicts and the creation of the dilemmas of security as grounded in reflexive practices rather than as the outcome of timeless structures.56

### 3

#### Plan causes a dysprosium shortage

The Economist 12 ("In a hole?" 5/17, http://www.economist.com/node/21550243)

MANY plans for reducing the world's emissions of carbon dioxide—at least, those plans formulated by environmentalists who are not of the hair-shirt, back-to-the-caves persuasion—involve peppering the landscape with wind turbines and replacing petrol-guzzling vehicles with electric ones charged up using energy gathered from renewable resources. The hope is that the level of CO2 in the atmosphere can thus be kept below what is widely agreed to be the upper limit for a tolerable level of global warming, 450 parts per million.¶ Wind turbines and electric vehicles, however, both rely on dysprosium and neodymium to make the magnets that are essential to their generators and motors. These two elements, part of a group called the rare-earth metals, have unusual configurations of electrons orbiting their nuclei, and thus unusually powerful magnetic properties. Finding substitutes would be hard. Motors or generators whose magnets were made of other materials would be heavier, less efficient or both.¶ At the moment, that is not too much of a problem. Though a lot of the supply of rare earths comes from China, whose government has recently been restricting exports (a restriction that was the subject of a challenge lodged with the World Trade Organisation by America, Europe and Japan on March 13th), other known sources could be brought into play reasonably quickly, like the Mountain Pass mine in California, pictured above, which re-opened for business in February. At current levels of demand any problem caused by the geographical concentration of supply would thus be an irritating blip rather than an existential crisis.¶ But what if the environmentalists' dream came true? Could demand for dysprosium and neodymium then be met? That was the question Randolph Kirchain, Elisa Alonso and Frank Field, three materials scientists at the Massachusetts Institute of Technology, asked themselves recently. Their answer, just published in Environmental Science and Technology, is that if wind turbines and electric vehicles are going to fulfil the role environmental planners have assigned them in reducing emissions of carbon dioxide, using current technologies would require an increase in the supply of neodymium and dysprosium of more than 700% and 2,600% respectively during the next 25 years. At the moment, the supply of these metals is increasing by 6% a year. To match the three researchers' projections it would actually have to increase by 8% a year for neodymium and 14% for dysprosium.

#### Shortage kills the Japanese economy

Handwerger 11 (Jeb, "Ucore: David Among The Goliaths Of Rare Earths," http://ucore.com/JebHandwerger\_Aug2011.pdf)

There was an impressive turnout of international rare earth ¶ experts, the investment community and major political heavyweights ¶ to the Ucore’s “Alaska Rare Earth Conference”. GST was right in the ¶ middle of this illustrious gathering. I couldn’t wait to impart my ¶ ﬁndings to my loyal subscribers. ¶ Let me begin by giving you the positive side of the story. It is the ¶ only company in the United States which has the goods for which the whole world is looking: dysprosium and terbium! These are heavy ¶ rare earths that industrial nations such as Japan absolutely require ¶ for their economic survival.

#### Nuclear war

The Guardian 2/11/02 (lexis)

Even so, the westcannot afford to be complacent about what is happening in Japan**,** unless it intends to use the country as a test case to explore whether a full-scale depression is less painful now than it was 70 years ago. Action is needed, and quickly because this is an economy that could soak up some of the world's excess capacity if functioning properly. A strong Japan is not only essential for the long-term health of the global economy, it is also needed as a counter-weight to the growing power of China. A collapse in the Japanese economy, which looks ever more likely, would have profound ramifications; some experts believe it could even unleash a wave of extreme nationalism that would push the country into conflict with its bigger (and nuclear) neighbour.

### 4

#### China’s beating the US in wind development now---it’s key to their overall clean-tech leadership---the plan reverses this

Zoninsein 10 Manuela is a writer for Climatewire, New York Times. “Chinese Offshore Development Blows Past U.S.,” Sept 7, http://www.nytimes.com/cwire/2010/09/07/07climatewire-chinese-offshore-development-blows-past-us-47150.html?pagewanted=all

As proposed American offshore wind-farm projects creep forward -- slowed by state legislative debates, due diligence and environmental impact assessments -- China has leapt past the United States, installing its first offshore wind farm. Several other farms also are already under construction, and even the Chinese government's ambitious targets seem low compared to industry dreaming. "What the U.S. doesn't realize," said Peggy Liu, founder and chairwoman of the Joint U.S.-China Collaboration on Clean Energy, is that China "is going from manufacturing hub to the clean-tech laboratory of the world." The first major offshore wind farm outside of Europe is located in the East China Sea, near Shanghai. The 102-megawatt Donghai Bridge Wind Farm began transmitting power to the national grid in July and signals a new direction for Chinese renewable energy projects and the initiation of a national policy focusing not just on wind power, but increasingly on the offshore variety. Moreover, "it serves as a showcase of what the Chinese can do offshore ... and it's quite significant," said Rachel Enslow, a wind consultant and co-author of the report "China, Norway and Offshore Wind Development," published in March by Azure International for the World Wildlife Fund Norway.

#### Chinese clean tech leadership is key to their economy, internal stability, and solves extinction

Paul Denlinger 10, consultant specializing in the China market who is based in Hong Kong, 7/20/10, “Why China Has To Dominate Green Tech,” http://www.forbes.com/sites/china/2010/07/20/why-china-has-to-dominate-green-tech/

On the policy level, the Chinese government has to perform a delicate balancing act, it has to balance the desire of many Chinese to live a Western lifestyle, together with its high energy consumption and waste, with the need to preserve the environment, since China, and the world, would suffer enormous damage if 1.3 billion people got all their energy needs from coal and oil, the two most widely used fossil fuels. China’s political and social stability depends on finding the right balance, since the party has an implicit mandate: it will deliver economic growth to the Chinese people. This is why the Chinese government has chosen to invest in developing new green energy technology. The country is very fortunate in that most of the discovered deposits of rare earths used in the development of new technologies are found in China. While these deposits are very valuable, up until recently, the industry has not been regulated much by the Chinese central government. But now that Beijing is aware of their importance and value, it has come under much closer scrutiny. For one, Beijing wants to consolidate the industry and lower energy waste and environmental damage. (Ironically, the rare earth mining business is one of the most energy-wasteful and highly polluting industries around. Think Chinese coal mining with acid.) At the same time, Beijing wants to cut back rare earth exports to the rest of the world, instead encouraging domestic production into wind and solar products for export around the world. With patents on the new technology used in manufacturing, China would control the intellectual property and licensing on the products that would be used all over the world. If Beijing is able to do this, it would control the next generation of energy products used by the world for the next century. That is the plan. It would be like if the oil-producing nations in the 1920s and 1930s said that they didn’t need Western oil exploration firms and refineries to distribute oil products; they would do all the processing themselves, and the Western countries would just order the finished oil products from them. This is how China obviously plans to keep most of the value-added profits within China’s borders. Before any Western readers snap into “evil Chinese conspiracy to take over the world” mode, it’s worth pointing out that Chinese rare earth experts and government officials have repeatedly warned Western visitors that this policy change would be introduced. Unfortunately, these warnings have gone largely unheeded and ignored by the Western media and politicians who, it seems, have been largely preoccupied by multiple financial crises and what to do about the West’s debt load. The debt crisis in the West means that it is very hard for Western green energy companies to find financing for their technologies, then to market them as finished products. New energy technologies are highly risky, and initial investments are by no means guaranteed. Because they are considered high-risk and require high capital expenditure (unlike Internet technologies which are very cheap and practically commoditized), banks are reluctant to finance them unless they are able to find government-secured financing. Because most U.S. banks are recapitalizing their businesses after the debt bubble burst, there are very few, if any western banks who will finance new green energy technologies. This has opened a window of opportunity for the Chinese government to finance, and for Chinese technology companies to develop, then manufacture these new green products. But just making these technologies is not enough; they need to be competitive against traditional fossil fuels. When it comes to the amount of energy released when coal or oil is burned, the new green technologies are still way behind. This means that, at least in the early stages of adoption, Chinese businesses will still be reliant on coal and oil to bridge that energy chasm before the new energy technologies become economically competitive. Much depends on how much the Chinese government is willing to spend to promote and incentivize these new technologies, first in China, then overseas. Because of China’s growing energy demands, we are in a race for survival. The 21st century will be remembered as the resurgent coal and oil century, or as the century humanity transitioned to green technologies for energy consumption. While China is investing heavily now in green tech, it is still consuming ever larger amounts of coal and oil to drive its economic growth. Right now, we all depend on China’s success to make the transition to green energy this century. For all practical purposes, we’re all in the same boat.

### 5

#### The United Mexican States should form interstate compacts to develop renewable energy and pressure the Federal Electricity Commission to support these efforts where necessary.

#### This solves

Wood 12 - PhD in Political Studies @ Queen’s, Professor @ ITAM in Mexico City

(Duncan, et al, Wilson Center, http://www.wilsoncenter.org/sites/default/files/Border\_Wind\_Energy\_Wood.pdf)//BB

State governments must take the lead in ¶ efforts to build the wind energy generation ¶ business in the north. The governments ¶ of Nuevo León and Tamaulipas highlight ¶ this, but it is Baja California that must be ¶ considered to be a model for effective policy ¶ implementation. There the construction and ¶ operation of the La Rumorosa I plant has ¶ shown how wind energy can be exploited in ¶ such a way as to provide employment and ¶ opportunities for local interests, improve ¶ the lives of inhabitants of the community, ¶ incorporate the local population into the ¶ planning process, and share benefits on ¶ an ongoing basis with socially vulnerable ¶ groups. The potential for knowledge ¶ spillovers and the creation of governmentbusiness-university clusters should also be ¶ examined more closely, as the government ¶ of Baja California is attempting with the ¶ creation of university-level programs for ¶ renewable energy.¶ However, state governments will not ¶ be able to move the process forward on ¶ their own. Due to the need to build new ¶ transmission capacity to move the newlygenerated electrons to market, the CFE ¶ and the federal government (through the ¶ Secretaría de Energía) will need to engage ¶ with state governments and the private ¶ sector. The current move towards open ¶ seasons for transmission is a welcome ¶ development, and has worked well in the ¶ United States and in Oaxaca. Another ¶ important lesson to learn from the United ¶ States would be for state governments to ¶ work together through the concept of inter-¶ state compacts to push CFE to address ¶ their needs.22

#### Starting with Mexico solves – they have a sufficient private sector and can partner with the US

Romero-Hernandez 12 – Professor @ Berkeley, PhD in Process Economics and Environmental Impact from Imperial College, London, UK

(Omar, et al, Wilson Center, http://www.wilsoncenter.org/sites/default/files/Border\_Biofuel\_Romero.pdf)//BB

Mexico has many non-profit and nongovernmental groups that could play ¶ a role in building the domestic MSW ¶ energy industry. One particular group ¶ if interest would be Red Mexicana de ¶ Bioenergía (REMBIO), created in Morelia, ¶ Michoacán, in 2006. The REMBIO is a ¶ non-governmental, non-profit organization ¶ that promotes sustainable and efficient use ¶ of biomass for energy purposes in Mexico. ¶ It currently includes leading experts in ¶ bioenergy in Mexico, has partners in most ¶ U.S. states, and would be an ideal partner ¶ for bioenergy developers in Mexico seeking ¶ to engage the community. ¶ REMBIO’s goal is to become a Mexican ¶ leader in promoting the use of socially, ¶ economically and environmentally ¶ sustainable biomass for energy purposes. ¶ They seek to accomplish this through the ¶ generation and dissemination of information, ¶ human resource training, exchange of ¶ experiences and by strengthening links ¶ between the main social actors interested ¶ in the subject. REMBIO hopes this will ¶ lead to an equitable distribution of energy ¶ services and access, while supporting energy ¶ security and alleviating poverty and climate ¶ change issues.¶ In order to accomplish its objectives ¶ REMBIO engages in a variety of activities:¶ ■ Publication of documents ¶ and studies.¶ ■ Dissemination of updated ¶ information on bioenergy.¶ ■ Development of strategic studies ¶ in the areas of interest.¶ ■ Providing feasibility studies ¶ and expert advice on ¶ project management.¶ ■ Carrying out analysis and ¶ evaluation of public policies.¶ ■ Participating in forums, ¶ conferences and seminars.¶ ■ Organizing courses and ¶ seminars, including an annual ¶ national meeting.¶ ■ Facilitating project execution.¶ Groups such as REMBIO can advance a ¶ team looking to develop bioenergy projects ¶ in Mexico — especially as it relates to ¶ achieving buy-in from the community.55

## Energy

#### 1 Heg decline is inevitable and doesn’t cause war- international institutions check any impact and it’s ineffective in the current political climate

Rothkopf 11/6- David, Rothkopf is President and CEO of Garten Rothkopf, an international advisory firm specializing in transformational trends especially those associated with energy choice and climate change, emerging markets and global risk, Visiting Scholar at the Carnegie Endowment for International Peace where he chairs the Carnegie Economic Strategy Roundtable, formerly Chief Executive of Intellibridge Corporation, managing director of Kissinger Associates and U.S. Deputy Under Secretary of Commerce for International Trade Policy. Rothkopf was also the Professor of International Affairs and National Security Studies at Columbia University's School of International and Public Affairs and Georgetown's School of Foreign Service (“Waiting in the Wings”, November 6, 2013 http://www.foreignpolicy.com/articles/2013/11/06/waiting\_in\_the\_wings\_the\_united\_states\_takes\_supporting\_role\_on\_global\_stage?page=0,1\\CLans)

When an actor in a show, even the star, freezes and forgets his lines during a performance, it's up to the others on the stage to break the uncomfortable silence and try to move the play forward. They might stumble or appear awkward, but the alternative -- to let the action grind to a halt -- is much worse. The audience waits, watching to see how and if the story will continue and at whose initiative. This is as true on the world stage as in the most remote regional theater. This weekend I had the opportunity to sit with a group of well-known Egyptian actors and producers, the top filmmakers from a country in crisis. When they heard I was an American from Washington, they began to vent. "How could Washington have turned their back on us?" they asked. How could we have failed to see that the June revolution -- 30 million people coming together to stop a man who was destroying the country -- was, in the words of one actress, "a miracle." Why, she asked, had we failed to challenge the leader deposed in that revolution, Mohamed Morsy, while he was systematically undercutting the fragile democracy he was entrusted to help build? Why would we not call out the Muslim Brotherhood for its violence? For the threat it posed to the entire Middle East? "We were your friends," the actress emoted. "We loved you. Why did you turn away?" "You're asking the wrong questions," I said. "I understand your frustration, but you can't afford to be so focused on the past. You can't afford to ask why America is doing what it is doing or not doing. If you want to recapture American support and the support of the world, you have to make a new story yourselves, create a more positive narrative that says that the June revolution was a turning point for the better." Another guest at the dinner table, an American who is working with the Egyptian government to help it shape its message linked to these issues, jumped in and said, "You have one thing you must focus on. In a matter of weeks, no more than a few months, you will have to produce the kind of result on the constitutional referendum that sends a clear message. Fifty-one percent in favor will not do. You need 70 or 75 percent support for the new constitution to have a clear mandate, for the new government to stand up to the opponents who will try to undermine it." Others at the table nodded. They understood this central truth. Because for those with hopes for Egyptian democracy, there should not be two things on the agenda. There can only be one: Create meaningful, lasting change that proves that reforms are in the name of Egypt's people -- which in this case means producing a national constitution that is seen to be a genuine manifestation of the will of the Egyptian people. In a country where the only real organizations with the capacity to effectively organize nationwide action are the military and the Brotherhood, this challenge is greater still. And the political infrastructure that such a campaign requires just isn't in place to support it. So such a campaign must be built and energized with a kind of single-mindedness that, frankly, the interim government has yet to sufficiently motivate or mobilize. That said, however, there is something happening in Egypt today that is remarkable, and it's sending a signal not just to the volatile region that is home to that country, but to the world. America, on the grand stage, may have forgotten its lines and gone all deer-in-the-headlights at just the wrong moment, but others are stepping up and moving the story forward in positive ways. Even though the United States failed to be tough with Morsy when it could have and should have, the constructive heavy-lifting is being done by others. The Saudis, the Kuwaitis, and the Emiratis are working together to provide the current regime with resources. But they are not just throwing money at the problem, pumping cash into a central bank account. They are methodically selecting big visible projects that are creating jobs and helping the wounded economy in crucial areas like infrastructure investment. This sends a message to Egyptian voters that the new way may be better for them, producing a better future. Naturally, the Gulf states are not doing this for entirely charitable reasons. They view the Muslim Brotherhood as a threat. They clearly want to stop it. They are also writing checks to cover Egyptian military arms purchases for which the United States has halted funding. But international actors act in their self-interest. And, geopolitics, like physics or a play in which the lead actor forgets his lines, abhors a vacuum. So what is happening in Egypt, like what is happening elsewhere in the Middle East and around the world, is that once-secondary players are assuming new roles -- roles that would have been hard to imagine either during the bipolar years of the Cold War or the brief unipolar moment that followed. In many places -- Iraq and Afghanistan come to mind -- what will fill the void left behind by the United States is likely to exacerbate the mess we helped create. But in other areas (and Egypt may be one of them), if a new constitution is actually produced, is seen as advancing the country toward democracy, and is then widely embraced, it will send the healthy message that regional solutions can work. Of course, America has not shuffled off the stage entirely. We have simply paused at an awkward moment. The world's sole superpower is not simply going to cease to play a role. But that role will inevitably, it seems, be somewhat smaller. We will be more circumspect in our actions, more reluctant to take risks. We have been strained by our own overreach internationally and by our mismanagement and political dysfunction at home, and we will move more slowly and take more limited actions. More often than before, we will stand by as others step up and find their own solutions. (All this, of course, as we and others continue to debate just how big the U.S. role should be, what risks we should take, and how we should lead.) Meanwhile, we will play a guiding or catalytic role where we can in select situations worldwide, no doubt frustrating many who are used to a stronger helping hand and letting someone else (us) do the heavy lifting. But even light-touch American intervention can still be useful, as hinted at this week with Secretary of State John Kerry's constructive brief visit to Egypt in which he noted that the interim government is making progress toward democracy. He did not make the recent U.S. error of overemphasizing the trappings of democracy -- which are often used as covers as they were by Morsy for intensely anti-democratic activities. Kerry focused as he (and we) should on democratic values and on the importance of continuing progress in their service. It was helpful and timely. As a consequence of these shifts, the world is going to have to get used to a new cast of featured players, many assuming more prominent roles than before in regional theaters of action. Indeed, recently, we have seen other examples of what this new world might look like. Whether they are homegrown trade initiatives like the Pacific Alliance in Latin America, or the German-Brazilian initiative in the U.N. to rein in surveillance abuses worldwide (though admittedly, the United States has had an inadvertently prominent role in that drama, wearing, unfortunately, a black hat), or the efforts among Asian countries to come up with a new regional architecture without much constructive involvement from the United States, or even the Russian initiative to address the chemical weapons issue in Syria, there are signs that a more subdued or hesitant America will leave open the door to new, more diverse collaborative processes for shaping the world of tomorrow. That is not to simply accept American retreat. As the richest and most powerful nation in the world, we have a vital role to play. Nor does noting the shift to a more pluralistic international system minimize the importance of the U.S. role when we do put our shoulder to the wheel as we have in Israel and Palestine, belatedly in Syria on chemical weapons, or with regard to sanctions against Iran. But even in those cases, the goal of the initiatives is -- let's be honest -- to produce outcomes in which the United States can be less active, less engaged. To some extent, what we are trying to do is make the world safe not for democracy, as Woodrow Wilson would have had it, but for American withdrawal. And frankly, given some of the mistakes we have made recently, it is hard not to wonder, unfamiliar and uncomfortable as it may be for everyone to accept, whether we might not sometimes get better outcomes from responsible leadership by actors other than the United States. That said, while the world will get along just fine if the United States sometimes takes a supporting role on the grand stage of global affairs, encouraging others to take the lead, there is a caveat. And that of course is that we don't screw things up in the role we do play. Again, the example of Egypt comes to mind. Leave it to our regional allies, virtually all of whom -- Arabs and Israelis alike -- support giving the current government a chance, to take matters into their own hands. But don't then start punishing that government in ways that we didn't and should have in the case of Morsy. As the great star of the global stage of the past century hesitates, pausing perhaps to reconsider its role, we cannot and should not expect the world to stop, nor can we or our friends around the world spend too much time lamenting the degree to which the present is not like the past or our own ideals of what a new new world order ought to look like. Problems need solving now. In the end, in places like Egypt, it is homegrown actors from that country and its neighbors who are going to have to continue to step into the limelight and shine and do it now, or we will have much darker outcomes to contemplate in the very near future.

**2 Squo solves energy dependence**

Drezner 12, IR prof at Tufts, “Predictions about the death of American hegemony may have been greatly exaggerated”, January 22, <http://drezner.foreignpolicy.com/posts/2012/01/22/predictions_about_the_death_of_american_hegemony_may_have_been_greatly_exaggerated>

A predicted decline in energy insecurity. British Petroleum has issued their Energy Outlook for 2030. The Guardian's Richard Wachman provides a useful summary: Growth in shale oil and gas supplies will make the US virtually self-sufficient in energy by 2030, according to a BP report published on Wednesday. In a development with enormous geopolitical implications, the country's dependence on oil imports from potentially volatile countries in the Middle East and elsewhere would disappear, BP said, although Britain and western Europe would still need Gulf supplies. BP's latest energy outlook forecasts a growth in unconventional energy sources, "including US shale oil and gas, Canadian oil sands and Brazilian deepwater, plus a gradual decline in demand, that would see [North America] become almost totally energy self-sufficient" in two decades. BP's chief executive, Bob Dudley, said: "Our report challenges some long-held beliefs. Significant changes in US supply-and-demand prospects, for example, highlight the likelihood that import dependence in what is today's largest energy importer will decline substantially." The report said the volume of oil imports in the US would fall below 1990s levels, largely due to rising domestic shale oil production and ethanol replacing crude. The US would also become a net exporter of natural gas. Note that this will take a while, and doesn't mean that the U.S. will be energy independent. Still, it's quite a trend. Or, rather, trends.

#### 3 Oil field reserve growth eliminates peak oil

**Maugeri, 12** - Research Fellow of the Geopolitics of Energy Project at the Belfer Center for Science and International Affairs at Harvard University and Former Visiting Scholar at MIT (Leonardo, June 2012, "Oil: The Next Revolution", p. 13, KONTOPOULOS) PDF

Two prominent geologists from the U.S. Geological Survey conducted a brilliant examination of "reserve growth" on a global scale. According to their extensive analysis, the estimated proven volume of oil in 186 well-known giant fields in the world (holding reserves higher than 0.5 billion barrels of oil, discovered prior to 1981) increased from 617 billion barrels to 777 billion barrels between 1981 and 1996.7 Because of "reserve growth," a country or a company may increase its oil reserves without tapping new areas if it can recover more oil from its known fields. One of the best examples of the ability to squeeze more oil from the ground comes from the Kem River Field in California. When the Kern River Oil Field was discovered in 1899, analysts thought that only 10 percent of its unusually viscous crude could be recovered, hi 1942. after more than four decades of modest production, it was estimated that the field still held 54 million barrels of recoverable oil, a fraction of the 278 million barrels already recovered. As observed by Morris Adelman. "In the next 44 years, it produced not 54 [million barrels] but 736 million barrels, and it had another 970 million barrels remaining."8 But even tins estimate proved incorrect. In November 2007, U.S. oil giant Chevron, by then the field's operator, announced cumulative production had reached two billion barrels. Today Kem River still yields nearly 80,000 barrels per day. and the state of California estimates its remaining reserves to be about 627 million barrels.9 Chevron began to increase production markedly in the 1960s by injecting steam into the ground, a novel technology at the time. Later, new exploration and drilling tools, along with steady steam injection, turned the field into a kind of oil cornucopia. Kem River is not an isolated case. The oil literature is filled with cases of oilfields that gained a second or third life after years of production, thanks to new technologies that made it possible to estimate the size of an oilfield resource better, to discover new satellites of the main oilfield, to extract more oil, and to manage the drilling and production operations better.

#### 4 Warming is not rapid

McGrath ’13 (Matt McGrath, Environment correspondent, BBC News, “Climate slowdown means extreme rates of warming 'not as likely'”, http://www.bbc.co.uk/news/science-environment-22567023, May 19, 2013)

Scientists say the recent downturn in the rate of global warming will lead to lower temperature rises in the short-term. Since 1998, there has been an unexplained "standstill" in the heating of the Earth's atmosphere. Writing in Nature Geoscience, the researchers say this will reduce predicted warming in the coming decades. But long-term, the expected temperature rises will not alter significantly. “Start Quote The most extreme projections are looking less likely than before” Dr Alexander Otto University of Oxford The slowdown in the expected rate of global warming has been studied for several years now. Earlier this year, the UK Met Office lowered their five-year temperature forecast. But this new paper gives the clearest picture yet of how any slowdown is likely to affect temperatures in both the short-term and long-term. An international team of researchers looked at how the last decade would impact long-term, equilibrium climate sensitivity and the shorter term climate response. Transient nature Climate sensitivity looks to see what would happen if we doubled concentrations of CO2 in the atmosphere and let the Earth's oceans and ice sheets respond to it over several thousand years. Transient climate response is much shorter term calculation again based on a doubling of CO2. The Intergovernmental Panel on Climate Change reported in 2007 that the short-term temperature rise would most likely be 1-3C (1.8-5.4F). But in this new analysis, by only including the temperatures from the last decade, the projected range would be 0.9-2.0C. Ice The report suggests that warming in the near term will be less than forecast "The hottest of the models in the medium-term, they are actually looking less likely or inconsistent with the data from the last decade alone," said Dr Alexander Otto from the University of Oxford. "The most extreme projections are looking less likely than before."

#### 5 Newest studies prove – their models are wrong and blow their impacts out of proportion

**Rose 11/2/13** [David Rose – Staff writer @ daily mail uk, Global warming 'pause' may last for 20 more years and Arctic sea ice has already started to recover, Read more: <http://www.dailymail.co.uk/news/article-2485772/Global-warming-pause-20-years-Arctic-sea-ice-started-recover.html#ixzz2juPOf1Mc>, accessed: 11/6/13, ML]

The 17-year pause in global warming is likely to last into the 2030s and the Arctic sea ice has already started to recover, according to new research. A paper in the peer-reviewed journal Climate Dynamics – by Professor Judith Curry of the Georgia Institute of Technology and Dr Marcia Wyatt – amounts to a stunning challenge to climate science orthodoxy. Not only does it explain the unexpected pause, it suggests that the scientific majority – whose views are represented by the UN Intergovernmental Panel on Climate Change (IPCC) – have underestimated the role of natural cycles and exaggerated that of greenhouse gases. The pause means there has been no statistically significant increase in world average surface temperatures since the beginning of 1997, despite the models’ projection of a steeply rising trend. According to Dr Hawkins, the divergence is now so great that the world’s climate is cooler than what the models collectively predicted with ‘five to 95 per cent certainty’. Curry and Wyatt say they have identified a climatic ‘stadium wave’ – the phenomenon known in Britain as a Mexican wave, in which the crowd at a stadium stand and sit so that a wave seems to circle the audience. In similar fashion, a number of cycles in the temperature of air and oceans, and the level of Arctic ice, take place across the Northern hemisphere over decades. Curry and Wyatt say there is evidence of this going back at least 300 years. According to Curry and Wyatt, the theory may explain both the warming pause and why the computer models did not forecast it. It also means that a large proportion of the warming that did occur in the years before the pause was due not to greenhouse gas emissions, but to the same cyclical wave. ‘The stadium wave signal predicts that the current pause in global warming could extend into the 2030s,’ said Wyatt. This is in sharp contrast with the IPCC’s report, which predicts warming of between 0.3 and 0.7C by 2035. Wyatt added: ‘The stadium wave forecasts that sea ice will recover from its recent minimum.’ The record low seen in 2012, followed by the large increase in 2013, is consistent with the theory, she said. Even IPCC report co-authors such as Dr Hawkins admit some of the models are ‘too hot’. He said: ‘The upper end of the latest climate model projections is inconsistent’ with observed temperatures, though he added even the lower predictions could have ‘negative impacts’ if true. But if the pause lasted another ten years, and there were no large volcanic eruptions, ‘then global surface temperatures would be outside the IPCC’s indicative likely range’. Professor Curry went much further. ‘The growing divergence between climate model simulations and observations raises the prospect that climate models are inadequate in fundamental ways,’ she said. If the pause continued, this would suggest that the models were not ‘fit for purpose’.

#### 6 No impact for 1.5 billion years

Spotts, 7/30/13 – Spotts is a graduate of the University of Miami in Coral Gables, Fla and a writer for CSM since 1976(Pete, “When would global warming destroy life on Earth? Study hazards a guess.” http://www.csmonitor.com/Science/2013/0730/When-would-global-warming-destroy-life-on-Earth-Study-hazards-a-guess)

The most recent of the two studies, published Monday in the journal Nature Geoscience, found that the amount of energy needed to shift a planet's climate into thermal overdrive at Earth's distance from the sun was about 10 percent less than estimates many scientists have been using for more than two decades. The research suggests that from a standpoint of Earth's climate, it would likely take another 1.5 billion years, even accounting for the pace at which human activities are pumping greenhouse gases into the air, for a runaway greenhouse effect to take over, says Colin Goldblatt, an assistant professor at the University of Victoria in British Columbia who studies the evolution of Earth's climate. The results also imply that a star's habitable zone – where a planet could capture enough warmth from its sun to allow liquid water to remain stable on the surface – may be smaller than previously estimated. If the results hold up, this would reduce the number of extrasolar planets deemed potentially habitable. The study serves as a useful reminder that scientists can't determine habitability only from estimates of how much radiation reaches a planet, says Larry Esposito, a researcher who studies planetary atmospheres at the University of Colorado at Boulder. A planet's current climate and the history of that climate play key roles, too. The atmospheric model used in looking at the greenhouse effect on Earth represents "a first pass at doing the problem again," says Dr. Goldblatt. It doesn't account for clouds, which would be crucial to determining the mount of sunlight reaching Earth's surface. Instead, the model operates assuming clear skies. "You start off with simple models. You try to understand the answers. Then you go on to more complex models," he says.Over the past 25 years, researchers have developed more-detailed measurements of water vapor and how it interacts with the infrared radiation the Earth's surface sends skyward. These improvements prompted the team to try to take another crack at measuring the energy needed to trigger a runaway greenhouse effect. Water vapor and other greenhouse gases absorb most of that radiation and re-radiate it in all directions, including back toward Earth's surface. But radiation in a narrow band of wavelengths can escape, allowing some of that heat to head back toward space. As the atmosphere warms, more water evaporates, and the atmosphere's ability to hold moisture increases. Runaway heating can occur when warming temperatures push enough water vapor into the air to in effect slam the infrared window shut, Goldblatt explains. Nor is sunlight alone in determining the surface temperature. A study published earlier this year in the journal Astrobiology described how tidal heating – the friction created within a planet as it is tugged by a star's gravity – could produce enough heat at the planet's surface to push an otherwise stable climate into runaway greenhouse warming. Runaway heating from these tidal forces would be limited to planets orbiting dim, low-mass red-dwarf stars along highly elliptical paths. Those paths might take the planet into and out of the star's habitable zone. While the planet might eventually stabilize in a circular orbit within a habitable zone, it would be bone-dry. he team, led by Rory Barnes, a research scientist at the University of Washington in Seattle, dubbed these runaway-heating victims "tidal Venuses." [Editor's note: The original version of this story misspelled the name of Rory Barnes.] For the more familiar Venus, the modeling Goldblatt and colleagues undertook imply that the planet may never have had oceans to begin with – unless the levels of nitrogen in its atmosphere were comparable to the relatively high levels seen today, Dr. Espositio suggests. Nitrogen is effective at scattering visible light and so would tend to be a cooling agent if it was present in sufficient amounts. Though the study would seem to rule out any immanent runaway greenhouse effect on Earth, Goldblatt underscores the importance of reining in global warming. "There is this thing known as a runaway greenhouse effect. It is easier than we thought to cause it. But it's not something that's likely to happen in the context of anthropogenic global change," he says. "But the flip side of that is that we really do need to still worry about anthropogenic global change. It's still a really big deal."

#### 7 No positive feedbacks---this takes out 100% of the impact to warming

Fritz Vahrenholt 12, Honorary Professor of chemistry at the University of Hamburg, former Umweltsenator in the German Ministry for Environment, Scientific Reviewer for the 2010 IPCC, June 18, 2012, “Global warming: second thoughts of an environmentalist,” The Telegraph, online: http://www.telegraph.co.uk/comment/9338939/Global-warming-second-thoughts-of-an-environmentalist.html

Furthermore, what is little known is that CO2 also requires a strong amplifier if it were to aggressively shape future climate as envisaged by the IPCC. CO2 alone, without so-called feedbacks, would only generate a moderate warming of 1.1°C per CO2 doubling. The IPCC assume in their models that there are strong amplification processes, including water vapour and cloud effects which, however, are also still poorly understood, like solar amplification. These are the shaky foundations for the IPCC's alarming prognoses of a temperature rise of up to 4.5°C for a doubling of CO2.

In the last 10 years the solar magnetic field dropped to one of its lowest levels in the last 150 years, indicating lower intensity in the decades ahead. This may have contributed to the halt in global warming and is likely to continue for a while, until it may resume gradually around 2030/2040. Based on the past natural climate pattern, we should expect that by 2100 temperatures will not have risen more than 1°C, significantly less than proposed by the IPCC.

Climate catastrophe would have been called off and the fear of a dangerously overheated planet would go down in history as a classic science error. Rather than being largely settled, there are more and more open climate questions which need to be addressed in an impartial and open-minded way.

Natural variability makes the impact inevitable and means that oceans will adapt—their studies don’t assume this

Hofmann 11, Professor of Ecology, Evolution and Marine Biology – University of California Santa Barbara et al.,

(Gretchen E., “High-Frequency Dynamics of Ocean pH: A Multi-Ecosystem Comparison,” *PLoS ONE* Vol. 6, No. 12)

Since the publication of two reports in 2005–2006 [1], [2], the drive to forecast the effects of anthropogenic ocean acidification (OA) on marine ecosystems and their resident calcifying marine organisms has resulted in a growing body of research. Numerous laboratory studies testing the effects of altered seawater chemistry (low pH, altered pCO2, and undersaturation states - Ω - for calcium carbonate polymorphs) on biogenic calcification, growth, metabolism, and development have demonstrated a range of responses in marine organisms (for reviews see [3]–[8]). However, the emerging picture of biological consequences of OA – from data gathered largely from laboratory experiments – is not currently matched by equally available environmental data that describe present-day pH exposures or the natural variation in the carbonate system experienced by most marine organisms. Although researchers have documented variability in seawater carbonate chemistry on several occasions in different marine ecosystems (e.g., [9]–[15]), this variation has been under-appreciated in these early stages of OA research.Recently, a deeper consideration of ecosystem-specific variation in seawater chemistry has emerged (e.g., [16]–[18]), one that is pertinent to the study of biological consequences of OA. Specifically, assessments of environmental heterogeneity present a nuanced complement to current laboratory experiments. The dynamics of specific natural carbonate chemistry on local scales provide critical context because outcomes of experiments on single species are used in meta-analyses to project the overall biological consequences of OA [7], [19], to forecast ecosystem-level outcomes [20], and ultimately to contribute to policy decisions [21] and the management of fisheries [22], [23]. As noted earlier [24], natural variability in pH is seldom considered when effects of ocean acidification are considered. Natural variability may occur at rates much higher than the rate at which carbon dioxide is decreasing ocean pH, about −0.0017 pH/year [25], [26]. This ambient fluctuation in pH may have a large impact on the development of resilience in marine populations, or it may combine with the steady effects of acidification to produce extreme events with large impacts [24]. In either case, understanding the environmental variability in ocean pH is essential. Although data on the natural variation in the seawater CO2 system are emerging, nearly all high-resolution (e.g. hourly) time series are based on pCO2 sensors, with comparatively few pH time series found in the literature. From a research perspective, the absence of information regarding natural pH dynamics is a critical data gap for the biological and ecological arm of the multidisciplinary investigation of OA. Our ability to understand processes ranging from physiological tolerances to local adaptation is compromised. Specifically, laboratory experiments to test tolerances are often not designed to encompass the actual habitat exposure of the organisms under study, a critical design criterion in organismal physiology that also applies to global change biology [27]–[29]. It is noted that neither pH nor pCO2 alone provide the information sufficient to fully constrain the CO2 system, and while it is preferred to measure both, the preference for measuring one over the other is evaluated on a case-by-case basis and is often dictated by the equipment available. In this light, data that reveal present-day pH dynamics in marine environments and therefore ground pH levels in CO2 perturbation experiments in an environmental context are valuable to the OA research community in two major ways. First, estimates of organismal resilience are greatly facilitated. Empiricists can contextualize lab experiments with actual environmental data, thereby improving them. Notably, the majority of manipulative laboratory experiments in OA research (including our own) have been parameterized using pCO2 levels as per the IPCC emission scenario predictions [30]. One consequence of this practice is that organisms are potentially tested outside of the current exposure across their biogeographic range, and tolerances are not bracketed appropriately. This situation may not be a lethal issue (i.e. negating all past observations in experiments where environmental context was not known); however, the lack of information about the ‘pH seascape’ may be translated through these organismal experiments in a manner that clouds the perspective of vulnerability of marine ecosystems. For example, recent data on the heterogeneity of pH in coastal waters of the Northeastern Pacific [31], [32] that are characterized by episodic upwelling has caused biologists to re-examine the physiological tolerances of organisms that live there. Specifically, resident calcifying marine invertebrates and algae are acclimatized to existing spatial and temporal heterogeneity [17], [18], and further, populations are likely adapted to local to regional differences in upwelling patterns [33]. Secondly, in addition to improving laboratory experiments, data regarding the nature of the pH seascape also facilitate hypothesis-generating science. Specifically, heterogeneity in the environment with regard to pH and pCO2 exposure may result in populations that are acclimatized to variable pH or extremes in pH. Although this process has been highlighted in thermal biology of marine invertebrates [34], such insight is not available with regard to gradients of seawater chemistry that occur on biogeographic scales. With that said, recent field studies have demonstrated that natural variation in seawater chemistry does influence organismal abundance and distribution [16], [35], [36]. With our newfound access to pH time series data, we can begin to explore the biophysical link between environmental seawater chemistry and resilience to baseline shifts in pH regimes, to identify at-risk populations as well as tolerant ones. Additionally, the use of sensors in the field can identify hidden patterns in the CO2 system, revealing areas that are refugia to acidification or carbonate undersaturation; such knowledge could enable protection, management, and remediation of critical marine habitats and populations in the future. The recent development of sensors for in situ measurements of seawater pH [37], [38] has resulted in the ability to record pH more readily in the field in a manner that can support biological and ecological research. Since 2009, the Martz lab (SIO) has constructed 52 “SeaFET” pH sensors for 13 different collaborators (see http://martzlab.ucsd.edu) working in a broad range of settings. Using subsamples of data from many of these sensors, here we examine signatures of pH heterogeneity, presenting time series snapshots of sea-surface pH (upper 10 m) at 15 locations, spanning various overlapping habitat classifications including polar, temperate, tropical, open ocean, coastal, upwelling, estuarine, kelp forest, coral reef, pelagic, benthic, and extreme. Naturally, at many sites, multiple habitat classifications will apply. Characteristic patterns observed in the 30-day snapshots provide biome-specific pH signatures. This comparative dataset highlights the heterogeneity of present-day pH among marine ecosystems and underscores that contemporary marine organisms are currently exposed to different pH regimes in seawater that are not predicted until 2100. Results Overall, the patterns of pH recorded at each of the 15 deployment sites (shown in Figure 1, Table 1) were strikingly different. Figure 2 presents the temporal pattern of pH variation at each of these sites, and, for the sake of comparison, these are presented as 30-day time series “snapshots.” Note that all deployments generated >30 days of data except for sensors 3, 4, and 13, where the sensors were deliberately removed due to time constraints at the study sites. Though the patterns observed among the various marine ecosystems are driven by a variety of oceanographic forcing such as temperature, mixing, and biological activity, we do not provide a separate analysis of controlling factors on pH at each location. Each time series was accompanied by a different set of ancillary data, some rich with several co-located sensors, others devoid of co-located sensors. Given these differences in data collection across sites, here we focus on the comparative pH sensor data as a means to highlight observed pH variability and ecosystem-level differences between sites. For purposes of comparison, the metrics of variability presented here are pH minima, maxima, range, standard deviation, and rate of change (see Table 2). The rate presented in Table 2 and Figure 3 represents a mean instantaneous rate of change in pH hr−1, where a rate was calculated for each discrete time step as the absolute value of pH difference divided by the length of time between two adjacent data points. In terms of general patterns amongst the comparative datasets, the open ocean sites (CCE1 and Kingman Reef) and the Antarctic sites (Cape Evans and Cindercones) displayed the least variation in pH over the 30-day deployment period. For example, pH range fluctuated between 0.024 to 0.096 at CCE1, Kingman Reef, Cape Evans, and Cindercones (Figure 2A, B and Table 2). In distinct contrast to the stability of the open ocean and Antarctic sites, sensors at the other five site classifications (upwelling, estuarine/near-shore, coral reef, kelp forest, and extreme) captured much greater variability (pH fluctuations ranging between 0.121 to 1.430) and may provide insight towards ecosystem-specific patterns. The sites in upwelling regions (Pt. Conception and Pt. Ano Nuevo, Figure 2C), the two locations in Monterey Bay, CA (Figure 2D), and the kelp forest sites (La Jolla and Santa Barbara Mohawk Reef, Figure 2F) all exhibited large fluctuations in pH conditions (pH changes>0.25). Additionally, at these 6 sites, pH oscillated in semi-diurnal patterns, the most apparent at the estuarine sites. The pH recorded in coral reef ecosystems exhibited a distinct diel pattern characterized by relatively consistent, moderate fluctuations (0.1<pH change<0.25; Figure 2E). At the Palmyra fore reef site, pH maxima occurred in the early evening (~5:00 pm), and pH minima were recorded immediately pre-dawn (~6:30 am). On a fringing reef site in Moorea, French Polynesia, a similar diel pattern was observed, with pH maxima occurring shortly after sunset (~7:30 pm) and pH minima several hours after dawn (~10:00 am). Finally, the greatest transitions in pH over time were observed at locations termed our “Extreme” sites - a CO2 venting site in Italy (site S2 in ref. [36]) and a submarine spring site in Mexico. For these sites, the patterns were extremely variable and lacked a detectable periodicity (Figure 2G). The sites examined in this study do not comprehensively represent pH variability in coastal ecosystems, partly because we focused on surface epipelagic and shallow benthic pH variability. Many organisms that may be impacted by pH variability and ocean acidification reside at intermediate (>10 m) to abyssal depths. Notable regimes missing from Figure 2 include seasonally stratified open ocean locations that exhibit intense spring blooms; the equatorial upwelling zone; other temperate (and highly productive) Eastern Continental Boundary upwelling areas; subsurface oxygen minimum zones and seasonal dead zones; and a wide variety of unique estuarine, salt marsh, and tide pool environments. Spring bloom locations exhibit a marked increase in diel pCO2 variability during the peak bloom with a coincident drawdown similar in magnitude but opposite in sign to the upwelling signals shown in Figure 2 [39]. Equatorial upwelling locations undergo significant stochastic variability, as observed by pCO2 sensors in the TAO array (data viewable at http://www.pmel.noaa.gov/). Intertidal vegetated and tide pool habitats may exhibit major pH fluctuations due to macrophyte or animal respiratory cycles [15], while CO2 production in oxygen minimum zones can reduce pH to a limit of about 7.4 [40]. Due to local temperature differences, variable total alkalinity, and seasonal differences between deployment dates at each site, a comparison of average pH across the datasets would be somewhat misleading. However, some information can be gleaned from an examination of the averages: the overall binned average of all 15 mean values in Table 1 is 8.02±0.1. This pH value is generally in agreement with the global open ocean mean for 2010 of 8.07, a value generated by combining climatology data for temperature, salinity, phosphate, silicate [41]–[43], total alkalinity [44], and pCO2 [45] for the year 2000, corrected to 2010 using the average global rise of 1.5 µatm pCO2 yr−1. Rather than make a point-by-point comparison of the mean pH of each dataset, we focus instead on the differences in observed variability amongst the sites. For this analysis, summary statistics of the comparative datasets were ranked in order to examine the range of variability across all 15 sites (Fig. 3). Discussion Collected by 15 individual SeaFET sensors in seven types of marine habitats, data presented here highlight natural variability in seawater pH. Based on Figure 3, it is evident that regions of the ocean exhibit a continuum of pH variability. At sites in the open ocean (CCE-1), Antarctica, and Kingman reef (a coastal region in the permanently stratified open Pacific Ocean with very low residence times, and thus representative of the surrounding open ocean water), pH was very stable (SD<0.01 pH over 30 days). Elsewhere, pH was highly variable across a range of ecosystems where sensors were deployed. The salient conclusions from this comparative dataset are two-fold: (1) most non-open ocean sites are indeed characterized by natural variation in seawater chemistry that can now be revealed through continuous monitoring by autonomous instrumentation, and (2) in some cases, seawater in these sites reaches extremes in pH, sometimes daily, that are often considered to only occur in open ocean systems well into the future [46]. Admittedly, pH is only part of the story with regard to the biological impacts of OA on marine organisms. However, continuous long-term observations provided by sensors such as the SeaFET are a great first step in elucidating the biophysical link between natural variation and physiological capacity in resident marine organisms. In the end, knowledge of spatial and temporal variation in seawater chemistry is a critical resource for biological research, for aquaculture, and for management efforts. From a biological perspective, the evolutionary history of the resident organisms will greatly influence the adaptation potential of organisms in marine populations. Thus, present-day natural variation will likely shape capacity for adaptation of resident organisms, influencing the resilience of critical marine ecosystems to future anthropogenic acidification. Below we discuss the comparative SeaFET-collected data and, where applicable, the biological consequences of the temporal heterogeneity that we found in each of the marine ecosystems where sensors were deployed. As the most stable area, the open ocean behaves in a predictable way and generally adheres to global models attempting to predict future CO2 conditions based on equilibration of the surface ocean with a given atmospheric pCO2 (e.g. [47]). This can be shown with longer-term pH records obtained with SeaFET sensors, which are available at the CCE-1 mooring (Fig. 4). The ambient pH values for this open ocean location can be predicted to better than ±0.02 from the CO2-corrected climatology mentioned above; pH has dropped by about 0.015 units since 2000. At CCE-1, the annual carbonate cycle followed the sea surface temperature cycle, and pH was driven mostly by changes in the temperature dependence of CO2 system thermodynamics (Figure 4). SeaFET observations at CCE-1 agree with the climatology to +0.017±0.014 pH units, with episodic excursions from the climatology but a general return to the climatological mean. Although the annual cycle in the open ocean is somewhat predictable, it is notable that even at these seemingly stable locations, climatology-based forecasts consistently underestimate natural variability. Our observations confirm an annual mean variability in pH at CCE-1 of nearly 0.1, suggest an inter-annual variability of ~0.02 pH, and capture episodic changes that deviate from the climatology (Figure 4). Similar underestimates of CO2 variability were observed at nine other open ocean locations, where the Takahashi pCO2 climatology overlaps PMEL moorings with pCO2 sensors (not shown). Thus, on both a monthly (Fig. 2) and annual scale (Fig. 4), even the most stable open ocean sites see pH changes many times larger than the annual rate of acidification. This natural variability has prompted the suggestion that “an appropriate null hypothesis may be, until evidence is obtained to the contrary, that major biogeochemical processes in the oceans other than calcification will not be fundamentally different under future higher CO2/lower pH conditions” [24]. Similarly, the sensors deployed on the benthos in the Antarctic (Cindercones and Cape Evans, Figure 2B) recorded relatively stable pH conditions when compared to other sites in the study. Very few data exist for the Southern Ocean; however, open-water areas in this region experience a strong seasonal shift in seawater pH (~0.3–0.5 units) between austral summer and winter [48], [49] due to a decline in photosynthesis during winter and a disequilibrium of air-sea CO2 exchange due to annual surface sea ice and deep water entrainment [50]. Given the timing of deployment of our sensor in McMurdo Sound (austral spring: October–November), the sensor did not capture the change in seawater chemistry that might have occurred in the austral winter [49]. In general, due to sea ice conditions, observations from the Southern Ocean are limited, with water chemistry data falling into two categories: (1) discrete sampling events during oceanographic cruises (e.g. US Joint Global Ocean Flux Study, http://www1.whoi.edu/) and (2) single-point measurements from locations under sea ice [49], [51], [52]. Biologically speaking, the Southern Ocean is a region expected to experience acidification and undersaturated conditions earlier in time than other parts of the ocean [47], and calcifying Antarctic organisms are thought to be quite vulnerable to anthropogenic OA given the already challenging saturation states that are characteristic of cold polar waters [53]–[56]. Short-term CO2 perturbation experiments have shown that Antarctic calcifying marine invertebrates are sensitive to decreased saturation states [51], [57], although the number of species-level studies and community-level studies are very limited. The Western Antarctic Peninsula and the sub-Antarctic islands will experience pronounced increases in temperature [54] and could consequently undergo more variation and/or undersaturation given the increased potential for biological activity. Importantly, depending on the patterns of seasonally-dependent saturation state that will be revealed with improved observations [58], Antarctic organisms may experience more variation than might be expected, a situation that will influence their resilience to future acidification. Three other types of study sites – the coastal upwelling, kelp forest and estuarine/near-shore sites – all exhibited variability due to a combination of mixing, tidal excursions, biological activity, and variable residence time (Fig. 2). Although these sites are all united by fairly obvious heterogeneity in pH, organisms living in these areas encounter unique complexities in seawater chemistry that will influence their physiological response, resilience, and potential for adaptation. Typically, estuarine environments have riverine input that naturally creates very low saturation states [59]–[61]. Seawater chemistry conditions in these areas often shift dramatically, challenging biogenic calcification by resident organisms. Additionally, these species must also tolerate abiotic factors that interact with pH, such as temperature [62]. Two sensors in the Monterey Bay region, L1 (at the mouth of Elkhorn Slough) and L20 (~2 km seaward and north of L1), recorded rapid changes in pH. However, as opposed to riverine input, the low pH fluctuations observed here are likely due to isopycnal shoaling or low CO2 water that is pulsing up to the near shore on internal tides. These locations may also experience high river run-off in the rainy season, but such conditions were not reflected in the time series shown in Fig. 2. Organisms living in upwelling regions may be acclimatized and adapted to extremes in seawater chemistry; here, deep CO2-enriched waters reach the surface and may shoal onto the benthos on the continental shelf [31], [32]. Data collected from our upwelling sites support the patterns found by cruise-based investigations; pH fluctuations were often sharp, and large transitions of up to ~0.35 pH units occurred over the course of days (Fig. 2). Laboratory studies on calcifying marine invertebrates living in upwelling regions suggest that these organisms maintain function under such stochastic conditions. However, overall performance may be reduced, suggesting that these species are indeed threatened by future acidification [17], [18], [63]. For kelp forests, although there is less influence from riverine inputs, pH variation is quite dynamic at these sites in the coastal California region (Fig 2; [18]). Patterns here are likely driven by fluctuations in coastal upwelling, biological activity, currents, internal tides, seasonally shoaling isopleths, as well as the size of the kelp forest, which may influence residence times via reduced flow. Kelps may respond positively to increased availability of CO2 and HCO3−, which may allow for reduced metabolic costs and increased productivity [64]. Increased kelp production may elevate pH within the forest during periods of photosynthesis, causing wider daily fluctuations in pH, though this is speculative at this time. As a result, kelp forests, particularly those of surface canopy forming species such as Macrocystis pyrifera, may contain a greater level of spatial heterogeneity in terms of the pH environment; vertical gradients in pH may form due to enhanced levels of photosynthesis at shallower depths. Such gradients may increase the risk of low pH exposure for benthic species while buffering those found within the surface canopy. Kelp forests provide habitat to a rich diversity of organisms from a wide range of calcifying and non-calcifying taxa [65]. As with organisms from the other coastal locations (estuarine and upwelling), the biota living within kelp forest environments are most likely acclimatized to this degree of natural variation. However, continued declines in oxygenation and shoaling of hypoxic boundaries observed in recent decades in the southern California bight [66], [67] are likely accompanied by a reduction in pH and saturation state. Thus, pH exposure regimes for the coastal California region's kelp forest biota may be changing over relatively short time scales. Over longer temporal scales as pH and carbonate saturation levels decrease, the relative abundances of these species may change, with community shifts favoring non-calcified species, as exemplified by long-term studies in intertidal communities by Wootton et al. [15]. For all the marine habitats described above, one very important consideration is that the extreme range of environmental variability does not necessarily translate to extreme resistance to future OA. Instead, such a range of variation may mean that the organisms resident in tidal, estuarine, and upwelling regions are already operating at the limits of their physiological tolerances (a la the classic tolerance windows of Fox – see [68]). Thus, future acidification, whether it be atmospheric or from other sources, may drive the physiology of these organisms closer to the edges of their tolerance windows. When environmental change is layered upon their present-day range of environmental exposures, they may thereby be pushed to the “guardrails” of their tolerance [20], [68]. In contrast to more stochastic changes in pH that were observed in some sites, our coral reef locations displayed a strikingly consistent pattern of diel fluctuations over the 30-day recording period. Similar short-term pH time series with lower daily resolution [69], [70] have reported regular diel pH fluctuation correlated to changes in total alkalinity and oxygen levels. These environmental patterns of pH suggest that reef organisms may be acclimatized to consistent but moderate changes in the carbonate system. Coral reefs have been at the center of research regarding the effects of OA on marine ecosystems [71]–[73]. Along with the calcification biology of the dominant scleractinian corals and coralline algae, the biodiversity on coral reefs includes many other calcifying species that will likely be affected [74]–[77]. Across the existing datasets in tropical reef ecosystems, the biological response of calcifying species to variation in seawater chemistry is complex (see [78]) –all corals or calcifying algal species will not respond similarly, in part because these calcifying reef-builders are photo-autotrophs (or mixotrophs), with algal symbionts that complicate the physiological response of the animal to changes in seawater chemistry. Finally, the “Extreme” sites in our comparative dataset are of interest in that the low pH levels observed here represent a natural analogue to OA conditions in the future, demonstrating how the abundance and distribution of calcifying benthic organisms, as well as multi-species assemblages, can vary as a function of seawater chemistry [16], [35], [36], [79]. The variability in seawater pH was higher at both the groundwater springs off the coast of Mexico and the natural CO2 vents off the coast of Italy than at any of the other sensor locations. Offshore of Puerto Morelos, Mexico (and at other sites along the Mesoamerican Reef), natural low-saturation (Ω~0.5, pH 6.70–7.30, due to non-ventilated, high CO2, high alkalinity groundwater) submarine springs have been discharging for millennia. Here, variability in pH is due to long-term respiration driving a low ratio of alkalinity to dissolved inorganic carbon in effluent ground water. These sites provide insight into potential long-term responses of coral backreef ecosystems to low saturation conditions [79]. Unlike Puerto Morelos, the variability of pH at volcanic CO2 vents at Ischia, Italy is almost purely abiotically derived, due entirely to CO2 venting and subsequent mixing. This site in the Mediterranean Sea hosts a benthic assemblage that reflects the impacts of OA on rocky reef communities [16], [36]. Overall, the ‘extreme’ systems provide an opportunity to examine how variability in pH and extreme events (sensu [80]) affects ecological processes. Knowledge of this biophysical link is essential for forecasting ecological responses to acidification in ecosystems with sharp fluctuations in pH, such as upwelling or estuarine environments. Despite reductions in species richness, several calcifying organisms are found in low pH conditions close to the vents [16] and the springs [79]. The persistence of calcifying organisms at these extreme sites, where mean pH values are comparable to those that have reduced organism performance in laboratory experiments (i.e., pHT 7.8; reviewed in [16]), suggest that long exposures to such variability in pH, versus a consistently low-pH environment, could play an important role in regulating organism performance. Variability in pH could potentially promote acclimatization or adaptation to acidification through repeated exposure to low pH conditions [24]; alternatively, transient exposures to high pH conditions could buffer the effects of acidification by relieving physiological stress. Thus, the ecological patterns coupled with the high fluctuations in pH at the extreme sites highlight the need to consider carbonate chemistry variability in experiments and models aimed at understanding the impacts of acidification.

#### 8 No impact to methane release

**Gillis 11** Justin Gillis, citing William S. Reeburgh, emeritus scientist at the University of California, expert on methane, The New York Times—Environment, 12/20/11, “Arctic Methane: Is Catastrophe Imminent?”, <http://green.blogs.nytimes.com/2011/12/20/arctic-methane-is-catastrophe-imminent/>

The basic worry is that as the climate changes, the ocean temperature could rise enough to destabilize many of these offshore methane deposits, sending them into the atmosphere. If you go beyond the Arctic and count deposits that exist off the margins of all the continents, there’s probably enough methane that a rapid release could turn the earth into a hothouse. But senior scientists I spoke with told me they considered any such rapid release to be **highly unlikely**, at least for the deeper deposits. A United States government report came to basically the same conclusion a few years ago. While examples can already be found of warmer ocean currents that are apparently destabilizing such deposits—for example, at this site off Spitsbergen, an island in the Svalbard archipelago in the Arctic—the scientists explained that a pervasive ocean warming sufficient to destabilize a lot of methane hydrates would almost certainly take thousands of years. And even if that happened, many scientists say that the methane released would largely be consumed in the sea (by bacteria that specialize in eating methane) and would not reach the atmosphere. That is what seems to be happening off Svalbard. “I think **it’s just dead wrong to talk about ‘Arctic Armageddon**,’ ” said William S. Reeburgh, an emeritus scientist at the University of California, Irvine, who spent decades studying such matters and says the likely consumption of methane within the ocean should not be underestimated. “Most of this methane is never going to see the atmosphere.”

#### 9 Environmental collapse doesn’t cause extinction – tech solves

**Science Daily 10**

Science Daily, reprinted from materials provided by American Institute of Biological Sciences, September 1, 2010, "Human Well-Being Is Improving Even as Ecosystem Services Decline: Why?", http://www.sciencedaily.com/releases/2010/09/100901072908.htm

Global degradation of ecosystems is widely believed to threaten human welfare, yet accepted measures of well-being show that it is on average improving globally, both in poor countries and rich ones. A team of authors writing in the September issue of BioScience dissects explanations for this "environmentalist's paradox." Noting that understanding the paradox is "critical to guiding future management of ecosystem services," Ciara Raudsepp-Hearne and her colleagues confirm that improvements in aggregate well-being are real, despite convincing evidence of ecosystem decline. Three likely reasons they identify -- past increases in food production, technological innovations that decouple people from ecosystems, and time lags before well-being is affected -- provide few grounds for complacency, however. Raudsepp-Hearne and her coauthors accept the findings of the influential Millennium Ecosystem Assessment that the capacity of ecosystems to produce many services for humans is now low. Yet they uncover no fault with the composite Human Development Index, a widely used metric that incorporates measures of literacy, life expectancy, and income, and has improved markedly since the mid-1970s. Although some measures of personal security buck the upward trend, the overall improvement in well-being seems robust. The researchers resolve the paradox partly by pointing to evidence that food production (which has increased globally over past decades) is more important for human well-being than are other ecosystem services. They also establish support for two other explanations: that technology and innovation have decoupled human well-being from ecosystem degradation, and that there is a time lag after ecosystem service degradation before human well-being will be affected.

## Grid

#### 1 Squo solves - no solar flares coming – and it’s physically impossible for them to be big enough to cause their impacts

**Howell 1-4**-13 (Elizabeth, Sun's 2013 solar storm peak expected to hit century low http://www.mnn.com/earth-matters/space/stories/suns-2013-solar-storm-peak-expected-to-hit-century-low)

**NASA uses three** different **satellites to track solar activity coming our way**. The **sun's peak of solar activity** this year **will** likely **be the quietest seen in at least 100 years, say NASA scientists** who watch Earth's closest star daily. Sunspot numbers are low, researchers said, even as [the sun](http://www.space.com/58-the-sun-formation-facts-and-characteristics.html) reaches the peak of its 11-year activity cycle. Also, radio waves that are known to indicate high solar activity have been very subdued. "It's likely to be the lowest solar maximum, as measured by sunspot 'number,' in more than a century," wrote Joe Gurman, a project scientist for NASA's sun-observing mission Stereo, or Solar TErrestrial RElations Observatory. The current sun weather cycle is known as Solar Cycle 24. Quiet as the sun may be, scientists still have a vested interest in watching it. A rogue flare could damage electrical grids or knock out communications satellites, as has happened many times before. Though solar science is still in its infancy, it has advanced greatly even from the time solar activity knocked out much of Quebec's electrical grid in 1989, Gurman pointed out. [[Worst Solar Storms in History](http://www.space.com/12584-worst-solar-storms-sun-flares-history.html)] "The interconnectedness of power grids has grown tremendously since the Hydro Québec issue," he wrote. "Compared to the frequency of widespread power outages due to trees falling on above-ground power lines during snowstorms or hurricane-force winds from storms such as the recent [Hurricane] Sandy, it's a very low order of probability event." Killer flares 'a **physical impossibility'** [Galileo Galilei](http://www.space.com/15589-galileo-galilei.html) was among the first to sight sunspots when he turned his telescope to the sun in 1610. Reliable records of sunspots date back to about 1849, when the Zurich Observatory began daily observations, according to NASA. Sunspots appear as dark blemishes on the sun, generally in clusters above and below the equator. Scientists now know these spots form due to the interplay between the sun's plasma (on the surface) and its magnetic field. Under some circumstances, the twisting magnetic fields near sunspots cause huge explosions such as solar flares, and plasma-rich [coronal mass ejections](http://www.space.com/11506-space-weather-sunspots-solar-flares-coronal-mass-ejections.html) often associated with the flares. These send charged particles out from the sun, and occasionally toward Earth. The strongest category of outburst, called an X-class solar flare, can cause havoc if it reaches Earth. The electrical charge can short out communications satellites or power grids. Medium-class M-type solar flares can supercharge Earth's northern lights displays, while weaker C-class flares and below can have relatively little effect, NASA has said. It is impossible for the sun to produce ["killer" solar flares](http://www.space.com/13587-killer-solar-storm-earth-2012-nasa.html) that were made popular by 2012 doomsday predictions, NASA's C. Alex Young told SPACE.com in an email. "On Earth we are completely protected from the direct effects of solar activity. The atmosphere shields us from the electromagnetic radiation from solar flares and the particles in a particle storm," wrote Young, a solar astrophysicist with NASA's Goddard Space Flight Center. [[Doomsday Myths Debunked by NASA: Countdown](http://www.space.com/14080-2012-doomsday-myths-debunked.html)] "[Killer flares] would not happen. The sun cannot produce flares (or CMEs) with enough energy to do this. It is a physical impossibility. It **would take the entire energy of the sun**, like a supernova. The sun will not become a supernova." Improvements in solar science Solar watching is a young science, but in recent decades, NASA has been working to improve the ability to predict and track solar flares and CMEs. The primary way is through using satellites to peer at the sun. The United States' official "space weather" forecaster is the Space Weather Prediction Center, a service of the National Oceanic and Atmospheric Administration (NOAA). Several NASA satellites feed the center data to assist with its predictions. According to NASA's William Pesnell, NASA's satellites work together like this: The [Solar Dynamics Observatory](http://www.space.com/10284-nasa-solar-dynamics-observatory.html) (SDO) can watch for CMEs from the moment they erupt from the sun. The [Solar and Heliospheric Observatory](http://www.space.com/18501-soho-solar-heliospheric-observatory.html) (SOHO) watches the charged particles, or plasma, on their journey toward Earth, making it easier to determine if they will hit the planet. If the plasma is Earth-bound, the two Stereo satellites orbiting the planet then observe the plasma and predict where it could hit. "The Earth is a very small target in a big solar system, and the models that try to track the CME through the solar system are still being developed," added Pesnell, the project scientist for SDO, in an e-mail to SPACE.com. "Our biggest advances," he added, "have been in models of the sun's magnetic field and using data in those models to explain the current sun. ... Our models try to explain the 11-year behavior of the solar cycle as the magnetic field moves around inside the sun, and then erupts through the surface to become sunspots." NASA also plans to launch the Interface Region Imaging Spectrograph (IRIS) mission in April 2013. When the satellite is ready, it will watch how energy and plasma move from the sun's surface to its corona or atmosphere, Pesnell said. "That means we will have good overlap to combine the different measurements [with SDO] and better understand the magnetic field of the sun."

#### 2 – grid turn – Grid expansion now – the plan speeds up renewable development – collapses reliability

Garrison 10 – Environment and Climate Change Consultant for the United States Agency for International Development (John L, “Clean Energy & Climate Change Opportunities Assessment for USAID/Mexico,” USAID, 4/30/10, http://pdf.usaid.gov/pdf\_docs/PNADS950.pdf)//SJF

b. Barriers to a Cross‐Border California‐Baja California Renewable Energy Market

A key issue for renewable energy power development is access to electricity grid infrastructure. A specific priority under the U.S.‐Mexico Bilateral Agreement is to promote the development of a regional renewable energy market between California and Baja California and to help facilitate the construction of new power lines in a sustainable manner.

In response to the adoption of California’s Renewables Portfolio Standard (RPS),the California Electricity Commission launched the California Renewable Energy Transmission Initiative (RETI) in the summer of 2007 to identify competitive renewable energy zones(CREZ) and possible transmission corridors and siting options to serve those zones. A year later, in May of 2008,the Western Governors’ Association and U.S. Department of Energy (DOE) launched the Western Renewable Energy Zones (WREZ)initiative, which includesrepresentativesfrom11 states, two Canadian provinces and areas in northern Mexico, to develop a framework for consensus among states and provinces within the Western Interconnection on how to best develop cost‐effective and environmentally sensitive renewable energy zones and transmission plans.41 Under Phase 2 of its renewable energy resource assessment, RETI completed a conceptual plan for expanding the California’s transmission grid to access the CREZ with the lowest costs and impacts needed to reach 33% electric power from renewables. Using National Renewable Energy Laboratory (NREL) data, the RETI assessment identified approximately 9,000 MW of wind potential in La Rumorosa resource area of which 2,400 MW was deemed to be highly competitive developable wind potential.42 The USAID CP/RE program also conducted a study on the export potential for wind energy to California and Texas.43

Existing cross‐border transmission is limited with only 800 MW of transmission capacity through two 230‐kV lines. At present, Sempra is seeking a permit from DOE to build a cross‐border transmission line to carry electricity from its wind turbines at La Rumorosa to the Southwest Powerlink in Imperial County, California with a potential for 1,250 MW. The California Independent System Operator(CAISO) has reportedly submitted interconnection applications for both La Rumorosa and Santa Catarina. Nevertheless, four additional transmission lines will be needed if Baja California’s wind potential is to be fully met.

For future cross border renewable energy trade to grow, however, a number of barriers must be overcome. For one, power exported from Mexico and sold to California under its RPS must show that it meets California’s environmental quality standards and that it protects the environment to the same extent as if it were located in California.44 The RPS environmental requirements are not clear and need to be better defined. Also of concern is the potential impact that intermittent wind energy might have on CFE’s and Imperial Irrigation District(IID) electrical grids even if not directly connected to them. Such impacts must be identified and addressed to CFE’s satisfaction prior to its concurrence of the CRE’s issuance of an energy export permit. The integration of 5,000 MW of wind from Baja California, for example, may require CFE’s 230‐kV East‐West corridor to be significantly reinforced raising the question, who will pay. CAISO is in contact with CFE and IID to study the impact that the region’s renewable energy cluster might have on their respective systems. Nevertheless, remediation of potential impacts will need to be addressed between the developer and CFE and/orIID.45

Another barrier to cross‐border renewable energy trade is the biennial re‐certification requirement. The designation of Baja California border area as an Energy Resource Area under the RETI process will also be important for future renewable energy development as will the expansion and strengthening of the transmission grid on the California side to reach highly populated areas. Given the current economic climate, the transmission expansion envisioned by RETI may not materialize.

#### Adding Mexico grid interconnections means increased renewable investment kills spare capacity – causes overstretch and blackouts

The Economist 11 (“Difference Engine: Disaster waiting to happen,” Babbage, 9/16/11, http://www.economist.com/blogs/babbage/2011/09/reliability-grid)//SJF

Yet, further down the coast, 6m citizens of southern California and south-west Arizona, along with their cousins across the Mexican border, were just recovering from a man-made disaster that had plunged their sweltering world into darkness—shutting down schools, hospitals, offices, factories, shops and restaurants, as lighting, air-conditioning and other essential equipment ceased to function. Beaches in San Diego had to be closed to the public because raw sewage had seeped into the sea. Passengers on trains stuck between stations and trapped in lifts had to be rescued by the police. Flights from San Diego International Airport were cancelled because security checkpoints were inoperable during the power outage and passenger processing could not be carried out. (Emergency runway lights meant that inbound flights could still land.) With traffic lights out of action and petrol stations unable to pump, motorists abandoned their vehicles and added to the gridlock that ruled the roads. By great good fortune, no-one died or was seriously injured. But normal life, for those so affected, ground to a miserable and unnerving halt. The difference between the two events could not have been more stark. One was all about preparedness and professionalism. The other was a forceful reminder of the chaos wrought by personal negligence and institutional neglect. “We don't need no lousy terrorists to cause mayhem,” San Diegans must have reflected afterwards. “We can manage just fine by ourselves.” The power outage that swept across a large swathe of the American south-west on September 8th was the region's worst cascading blackout in 15 years. It started at the North Gila substation near Yuma, Arizona, where a utility employee “was doing some work” on faulty equipment. Something happened (still under investigation) to cause the substation to shut down, disconnecting a 500kV transmission line connected to it and disrupting the electricity supply to Yuma's 90,000 residents. The immediate power shortage at Yuma caused the current—which normally flows along the grid's key Southwest Power Link from Arizona to California—suddenly to reverse its direction. The result was a violent fluctuation in line voltage that fed back through the grid to trip switches at substations throughout the San Diego area. Altogether, some 15 power stations in the region shut down automatically to protect themselves from voltage swings—the biggest being the 2,200MW San Onofre nuclear power plant up the coast near San Clemente. With the San Onofre plant disconnected and the umbilical cord from Arizona effectively severed, the delicately balanced grid serving San Diego and its adjacent counties quickly became unstable. Such problems would normally be resolved by ratcheting up the output of surrounding power stations. But with so little base-load capacity in the area, standby plants for meeting peak demand could not be spun up fast enough to stabilise the voltage. The overloaded grid promptly crashed, causing blackouts to spread across the region and into Mexico. The lights did not come back on until the following morning. The wind was blowing at only 8mph and the sky was partially overcast. So, California's lauded sources of renewable energy were of little help. If anything, they were part of the problem. Critics point out, with some justification, that California's energy strategy of focusing on conservation and expanding intermittent sources of renewable energy—while ignoring the urgent need for more base-load generating capacity close to big cities—was the primary cause of the grid failure. The wider issue is that the original voltage spike which triggered the monster outage should have been isolated at the Yuma substation in Arizona. The two official bodies responsible for overseeing the distribution and reliability of bulk power in the United States—the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation (NERC)—have launched an inquiry to learn why that did not happen. Their report will no doubt apportion blame and recommend changes in maintenance procedures. But few expect it to address the underlying problem. Both FERC and NERC are only too aware of the structural reasons why the American grid has become so fragile. They are equally aware of how intractable to solution those reasons are. As elsewhere, the electrical-power industry in America has changed over recent decades from a collection of heavily regulated regional monopolies to a complex, competitive, national, free-market business. In the process, electricity has become a commodity, with futures and contracts traded by participants just like any other commodity business. Independent power providers and transmission companies construct their own facilities, often paid for with bonds backed by future revenue streams. Retailers sign up customers, buy the electricity from wholesalers around the country, and bill users for it. Managing supply and demand, once the prerogative of the utilities' planners, has become a process shaped largely by an energy company's appetite for risk. Meanwhile, independent system operators who schedule the dispatches of electricity have become, effectively, asset managers—using market-clearing prices to equilibrate between bids by suppliers and those from retailers. By and large, such changes have made energy markets more efficient. For consumers, the competition created by deregulation has kept a lid on electricity prices. But it has had downsides, too. One of the biggest is the way it has removed what little spare capacity the grid once had. In the power industry's new competitive environment, transmission companies operate their lines at near full capacity, leaving little room for those threatening fluctuations in voltage caused by accidental outages. Compounding matters further is the way long-distance transmission lines connecting utilities around the country are being used differently these days. Before deregulation, such links were employed largely for emergencies—for when, say, a utility found its voltage dipping precipitously and a brownout imminent. Today, long-haul power lines are frequently made to handle more power than they were designed to, as wholesalers sell their electricity over longer and longer distances. The juice that comes out of a plug in clean-energy California can easily have come from a dirty coal-fired plant in Wyoming or West Virginia. As a result, the grid now suffers far greater fluctuations in electricity flow than ever before. The continual cycling of power plants up and down to meet demand from elsewhere in the country causes generating and transmission parts to heat up and cool down repeatedly. No surprise that they then wear out faster. Meanwhile, the amount of money the American power industry spends on maintenance has declined steadily, by 1% a year since 1992. With the grid's most critical components—the transformers at substations—now typically 40 years old, there are serious consequences for the stability and reliability of the grid as a whole. Another downside of deregulation has been the decline in investment. As the independent power providers, the electricity retailers and the utilities have no responsibility for the grid's main links, they have little incentive to maintain them properly. And as long as it is possible to purchase electricity elsewhere, there is little further incentive—as in the case of San Diego—to add more capacity locally. More and more blackouts sweeping the country are therefore inevitable. Will the so-called “smart grid” improve matters? It could do the opposite. All the smart grid does is add a communications layer to the local electricity-distribution network—so consumers can see at a glance how much electricity they are using at any time of the day, and how much it is costing them. Alerts sent by the utility at peak periods will allow customers to cut back their consumption and save money—or have it cut back for them to reap extra rewards. The real aim, of course, is to save the utility from having to invest in additional capacity. What is rarely mentioned in all the proselytising about the smart grid is that it adds a vast layer of hackable points to the network—some 440m by 2015, according to Lockheed Martin's Energy and Cyber Services. Every smart meter in the home will be a hackable device. The same goes for all the routers at substations. As the saying goes, if you can communicate with it, you can hack it. Today, you can cut off the power to someone's home by shinning up the nearest electricity pole and throwing a switch at the top. Once smart meters become widespread, you will be able to do that remotely, from the far side of the world. But evil-doers from afar might not stop at that. Instead of switching off the power, they could run the voltage up and down to wreck sensitive electronic equipment, such as computers and television sets. And they could do that not just on single homes, but on whole communities and even to routers in substations—in an attempt to take transformers offline, if not actually fry them. As we saw last week, the failure of just one substation in Yuma was enough to bring a whole chunk of the American south-west to its knees. Unless the grid is made more robust and secure, the threat to the country—from terrorist or technician—can only become more severe.

#### Blackouts risks nuclear meltdowns – turns the aff

Cappiello, 11 (3/29/2011, Dina, “AP IMPACT: Long blackouts pose risk to US reactors,” [http://www.utsandiego.com/news/2011/mar/29/ap-impact-long-blackouts-pose-risk-to-us-reactors/)](http://www.utsandiego.com/news/2011/mar/29/ap-impact-long-blackouts-pose-risk-to-us-reactors/%29)

WASHINGTON — It's a nightmarish scenario - a days-long blackout at a nuclear power plant leading to a radioactive leak. Though the odds of that happening are extremely remote, an Associated Press investigation has found that some U.S. plants are more vulnerable than others. Long before the nuclear emergency in Japan, U.S. regulators knew that a power failure lasting for days at an American nuclear plant, whatever the cause, could lead to a radioactive leak. Even so, they have only required the nation's 104 nuclear reactors to develop plans for dealing with much shorter blackouts on the assumption that power would be restored quickly. In one simulation presented by the Nuclear Regulatory Commission in 2009, it would take less than a day for radiation to escape from a reactor at a Pennsylvania nuclear power plant after an earthquake, flood or fire knocked out all electrical power and there was no way to keep the reactors cool after backup battery power ran out. That plant, the Peach Bottom Atomic Power Station outside Lancaster, has reactors of the same older make and model as those releasing radiation at Japan's Fukushima Dai-ichi plant, which is using other means to try to cool the reactors. And like Fukushima Dai-ichi, the Peach Bottom plant has enough battery power on site to power emergency cooling systems for eight hours. In Japan, that wasn't enough time for power to be restored. According to the International Atomic Energy Agency and the Nuclear Energy Institute trade association, three of the six reactors at the plant still can't get power to operate the emergency cooling systems. Two were shut down at the time. In the sixth, the fuel was removed completely and put in the spent fuel pool when it was shut down for maintenance at the time of the disaster. A week after the March 11 earthquake, diesel generators started supplying power to two other two reactors, Units 5 and 6, the groups said. The risk of a blackout leading to core damage, while extremely remote, exists at all U.S. nuclear power plants, and some are more susceptible than others, according to an Associated Press investigation. While regulators say they have confidence that measures adopted in the U.S. will prevent or significantly delay a core from melting and threatening a radioactive release, the events in Japan raise questions about whether U.S. power plants are as prepared as they could and should be. As part of a review requested by President Barack Obama in the wake of the Japan crisis, a top Nuclear Regulatory Commission official said Tuesday that the agency will investigate whether the nation's nuclear reactors are capable of coping with station blackouts and whether regulatory requirements need to be strengthened. Bill Borchardt, the agency's executive director for operations, said an obvious question is whether nuclear plants need enhanced battery supplies, or ones that can last longer. "There is a robust capability that exists already, but given what happened in Japan there's obviously a question that presents itself: Do we need to make it even more robust," he said at a hearing before the Senate Energy and Natural Resources Committee. "We didn't address a tsunami and an earthquake, but clearly we have known for some time that one of the weak links that makes accidents a little more likely is losing power," said Alan Kolaczkowski, a retired nuclear engineer who worked on a federal risk analysis of Peach Bottom released in 1990 and is familiar with the updated risk analysis. Risk analyses conducted by the plants in 1991-94 and published by the commission in 2003 show that the chances of such an event striking a U.S. power plant are remote, even at the plant where the risk is the highest, the Beaver Valley Power Station in Pennsylvania. These long odds are among the reasons why the United States since the late 1980s has only required nuclear power plants to cope with blackouts for four or eight hours. That's about how much time batteries would last. After that, it is assumed that power would be restored. And so far, that's been the case. Equipment put in place after the Sept. 11, 2001, terrorist attacks could buy more time. Otherwise, the reactor's radioactive core could begin to melt unless alternative cooling methods were employed. In Japan, the utility has tried using portable generators and dumping tons of seawater, among other things, on the reactors in an attempt to keep them cool. A 2003 federal analysis looking at how to estimate the risk of containment failure said that should power be knocked out by an earthquake or tornado it "would be unlikely that power will be recovered in the time frame to prevent core meltdown." In Japan, it was a one-two punch: first the earthquake, then the tsunami. Tokyo Electric Power Co., the operator of the crippled plant, found other ways to cool the reactor core and, so far, avert a full-scale meltdown without electricity. "Clearly the coping duration is an issue on the table now," said Biff Bradley, director of risk assessment for the Nuclear Energy Institute. "The industry and the Nuclear Regulatory Commission will have to go back in light of what we just observed and rethink station blackout duration." David Lochbaum, a former plant engineer and nuclear safety director at the advocacy group Union of Concerned Scientists, put it another way: "Japan shows what happens when you play beat-the-clock and lose." At Tuesday's Senate committee hearing, he said the government and the nuclear power industry have to do more to cope with prolonged blackouts, such as having temporary generators on site - or at nearby military bases - that can recharge batteries. A complete loss of electrical power, generally speaking, poses a major problem for a nuclear power plant because the reactor core must be kept cool, and back-up cooling systems - mostly pumps that replenish the core with water- require massive amounts of power to work. Without the electrical grid, or diesel generators, batteries can be used for a time, but they will not last long with the power demands. And when the batteries die, the systems that control and monitor the plant can also go dark, making it difficult to ascertain water levels and the condition of the core. Eleven U.S. reactors are designed to cope with a station blackout lasting eight hours, while 93 are designed for four-hour blackouts.

## Solvency

#### 1 Several barriers prevent sustainable development

Garrison 10 – Environment and Climate Change Consultant for the United States Agency for International Development (John L, “Clean Energy & Climate Change Opportunities Assessment for USAID/Mexico,” USAID, 4/30/10, http://pdf.usaid.gov/pdf\_docs/PNADS950.pdf)//SJF

3.1.2 Barriers to Renewable Energy and Energy Efficiency in Mexico a. Renewable Energy Barriers Low Energy Rates Based on Short‐Term Marginal Costs. There is significant renewable energy and energy efficiency potential in Mexico. Nevertheless, both sectors in Mexico have been slow to grow. By far the greatest barrier to renewable energy in Mexico lies in the price of electricity paid by CFE to electricity producers. At present, CFE is required to produce power at the lowest cost. The rate paid for power from small producers or for surplus power from self‐supply projects is established by the short term marginal cost of gas‐fired plants.28 As environmental externalities are not taken into account, even with the rise in natural gas prices the rate remains too low to cover the costs of current renewable energy technologies. CFE’s first concession attempt for the 101 MW La Venta III wind project, for example, failed despite a grant from the World Bank to provide financial incentives.29 Electricity rates are based on generation, transmission and distribution costs provided by CFE. Rates are set by the Secretary of Treasury and Public Credit(Secretaría deHacienda y Crédito Público – SHCP) with input from CFE and SENER. At present, such rates do not take into account environmental externalities of fossil fuels, which puts renewable energy at a disadvantage. Fortunately, the new renewable energy law requires that SENER develops a methodology for determining environmental externalities for electric power generation to be considered in setting the price of electricity. In addition, according to a World Bank study, electricity subsidies in Mexico are among the highest in the world costing the country approximately $9 billion, roughly equal to one‐third of electricity sector revenues in 2006.30 Two thirds of the subsidies go to residential users. Agricultural electricity use receives the highest rate ofsubsidy.31 The residential and agricultural electricity use subsidies are a disincentive to improving efficiency. Tariffs for the commercial sector and for public services, on the other hand are high, 32 and large users are increasingly turning to independent power generation (in many cases from wind)through self‐supply agreements to protect themselves against the potential rise in electricity costs.33 High prices in theory make energy conservation and efficiency projects more attractive. Other Barriers to Renewable Energy. While price is the main barrier to renewable energy development in Mexico, the following is a list of additional renewable energy barriers identified by the Inter‐American Development Bank’s “A Blueprint for Green Energy in the Americas” and the Bank’s “Mexico Public‐Private Sector Renewable Energy Program” Clean Technology Fund (CTF) Proposal: Regulatory Barriers: There is a lack of transparency and uncertainty in CFE’s independent power producer tendering process including the definition of ceiling prices and the selection criteria. For auto‐generation projects, there is a lack of legal clarity in terms of CFE’s purchase of excess electricity.34 Lack of Incentives: Even under the new regulatory framework, it remains to be seen whether new measures to promote renewables will be sufficient to enable renewable energy to compete with combined‐cycle natural gas fired plants. CFE renewable energy projects have also been hampered by the expectation that such investments must obtain aminimum12% return.35 Transmission Access, Capacity and Fees: Many viable small scale hydro projects that take advantage of existing irrigation channels are far from existing transmission lines. This is also true for wind energy projects. Transmission capacity in areas with large renewable energy potential is also an issue. For example, additional transmission capacity will be required to expand the cross‐border sale of renewable energy to the State of California. In the state of Oaxaca, 13 private auto‐generation developers on the Isthmus of Tehuantepec were required to build the interconnection infrastructure to bring the wind generated power to the main transmission network at a cost of $200million.36 Furthermore, grid interconnection charges are set on a case‐by‐case basis with no clear methodology for calculating the charges.37 Permitting Time: Small hydro projects, in particular, require extensive permits including water‐use and land‐use concessions, and project approval from the National Water Commission (Comisión Nacional del Agua ‐ CNA).38 CFE approval procedures for renewable energy projects lead to high up‐front and transaction costs.39 Limited Access to Finance: Rural communities are often unable to pay the cost of off‐grid renewable electricity without some form of outside assistance. Mexico’s national development banks have not developed financial instruments that adequately address the renewable energy sector’s risks and liquidity needs.40 Environmental Concerns: Apart from the environmental concerns associated with large hydroelectric dams, potential geothermal sites are located near or in ecological reserves. Wind and large solar projects also have potentially negative environmental and social impacts. Class Seven Winds: High winds in the States of Oaxaca and Baja California limit the types of wind turbines available for such high wind conditions.

#### 2 Long time-frame

Lokey 11 (Elizabeth Lokey, Environmental Studies, University of Colorado, “Barriers to clean development mechanism renewable energy projects in Mexico”, Renewable Energy Vol. 34 Issue 3, 504-508, Science Direct | JJ)

Because of these barriers for CDM participation from the state-run generation company, privately-owned generation comprises the sector with the most potential for utilization of the CDM. The mere fact that private generation makes up only 17.73% of the country's portfolio limits the number of projects that can be developed [18]. A multitude of barriers to renewable energy development in Mexico for independent power producers (IPPs) have also caused this market to move slowly. For an IPP to begin generating electricity over .5 MW in Mexico, the company must not only apply for a generation permit, but also obtain land and/or water leases for the site of generation. Because there are few land deeds that show legal ownership of property, IPPs sometimes have to go through an arduous process of having the local inhabitants first apply for their land deed before the IPP can legally lease it. Some companies have had the experience of purchasing land from the legal owner and later finding that people are living illegally on the land but claim it as their own. Relocating these people has been problematic and time-consuming [19]. Siting a project that is near a surrounding community can also be a difficult process. COMEXHIDRO had to convince locals that the power plant they planned on building near farmers’ fields would not electrify crops and that the dam would not take any water away from the irrigation efforts. At the proposed Benito Juarez COMEXHIDRO site in Oaxaca, locals are barring the construction of the dam because they think preventing the project will provide them with the leveraging power to oust the current Governor of Oaxaca [19]. Fuerza Eólica contracted a person to act as a community liason in Baja California to handle the land leasing and community relations, only to find that he was working for another company and started a land bidding war that raised the price of the land for wind project development [20]. In general, project developers have found that locals, officials, and even ornithologists, who study the impact wind turbines could have on birds and bats, often demand illegal payouts in order to allow the project to be completed [20]. The next stage in the process for the IPP to begin operations is for it to negotiate a price for transmission and firming capacity with CFE. The transmission charge is what CFE charges the IPP to use the excess capacity on the lines and the firming charge is the amount charged to provide back-up energy for the investors in case what they use is more than what the renewable generator produces over a monthly period. The tariffs charged by CFE constitute between 15 and 30% of the price per kWh that the customer eventually pays to the IPP [19] and [20]. The next stage of the process requires the IPP to complete a Power Purchase Agreement (PPA) under one of the five schemes provided by the 1992 Electric Energy Public Service Law (Ley de Servicio Público de Energía Eléctrica). Most renewable generators opt for the self-supply scheme, which entails an agreement between project investors and the IPP. Investors must purchase at least one share of the project company and then sign a long-term PPA [21]. In most cases, the price offered by the IPP must be less than what investors currently pay CFE to be competitive. However, to some in energy-intensive sectors, a long-term, fixed electricity price is attractive as it acts as a hedge against upward fluctuations in hydrocarbon markets. Then, the IPP is allowed to feed the amount of electricity into the grid as their customers use. If more energy is produced than the investors can use, then CFE buys the electricity from the IPP at 85% of their avoided costs. If less electricity is produced than determined by the initial capacity calculation, then higher capacity charges can apply in the next contract between CFE and the IPP. An Environmental Impact Statement assessing the potential environmental ramifications of the project must be prepared, and usually costs several thousand dollars. Only after all of these hurdles have been overcome can the project begin to consider applying for CDM revenues and undergo the lengthy CDM process.

#### **3 Doublebind – either Mexican renewable energy is cheap and doesn’t qualify for state funding, or it’s expensive and never gets adopted**

Lokey 11 (Elizabeth Lokey, Environmental Studies, University of Colorado, “Barriers to clean development mechanism renewable energy projects in Mexico”, Renewable Energy Vol. 34 Issue 3, 504-508, Science Direct | JJ)

The most significant hurdle to renewable energy development is that CFE, which controls most of the country's generation, currently cannot build renewable energy projects because the levelized cost of all types of renewable energy in the country is more expensive than conventional energy. According to federal law, CFE must develop new capacity additions that will provide the cheapest electricity for citizens. Currently, there are no regulatory mandates like domestic renewable energy targets or financial incentives like feed-in tariffs, which offer generators a fixed price for renewable energy based on installed capacity or energy produced, or production tax credits, which provide extra revenue per kWh of renewable energy produced, to make this type of generation competitive with fossil-fuel based generation. Also, in the planning process for new capacity additions, there is no incorporation of a future carbon tax, which would make renewables more competitive with conventional energy. The revenue that can be derived from the CDM for renewable energy projects is also not a part of the economic analysis made when considering new capacity additions [16]. If a project does not pass the financial analysis and get selected as the least-cost technology, then it is not published in the long-term planning process book that is presented before Congress and passed yearly. Capacity additions that are not in this book will not be considered for CFE development. However, if renewable energy is found to be the least-cost option and published in the long-term planning book, then this renewable energy would most likely not qualify for CDM revenues because it would fail both financial and regulatory additionality tests, which require that the project cause emission reductions beyond what would have occurred in a business-as-usual scenario [16].

#### 4 No transmission capacity

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(Duncan, et al, Wilson Center, http://www.wilsoncenter.org/sites/default/files/Border\_Wind\_Energy\_Wood.pdf)//BB

For the state of Baja California, this ¶ problem is made even more acute because ¶ there is no interconnection between ¶ the state and the national grid, making ¶ export of electricity to private consumers ¶ in other states impossible at the present ¶ time. Mexico’s national grid is in fact three ¶ grids, with Baja California Norte and ¶ Baja California Sur each having their own ¶ independent system.¶ A further level of difficulty is found ¶ with cross-border transmission. A quick ¶ survey of the above map shows that there are ¶ only a limited number of interconnections¶ across the border. Furthermore, only 5 of ¶ these connections are bi-directional. In ¶ Baja California, the Miguel-Tijuana and the ¶ Imperial Valley-Rosarita interconnections ¶ (both 230kV AC) have a combined capacity ¶ of 800 MW, in Coahuila the Eagle PassPiedras Negras interconnection (138kV ¶ HVDC) has a capacity of only 38 MW, and in ¶ Tamaulipas the Laredo-Nuevo Laredo (138kV ¶ VFT) and McAllen-Reynosa (138kV HVDC) ¶ interconnections have a combined capacity of ¶ 250 MW. These interconnections are maxed ¶ out and therefore cannot be considered ¶ for future cross-border electricity trade. In ¶ addition to these lines operated by CFE, there ¶ are two privately owned transmission lines of ¶ 310 MW (owned by Intergen) and 1200 MW ¶ (owned by Sempra).¶ The problem of cross-border ¶ transmission has been identified in a number ¶ of previous reports on wind and renewable ¶ energy in Mexico,5¶ and in 2010 the two ¶ countries set up a task-force to address ¶ the issue.6¶ Although this group has met a ¶ number of times, there appears to be little ¶ momentum behind the initiative, with each ¶ side blaming the other for lack of progress.