Yaminay Chaudhri ~ Anxious Public Space (A Preface)

What is the city but the people?" asks the opening sentence of the Capital Development Authority's (CDA) website. The sentence – originally from Shakespeare's play *Coriolanus* – expresses a sentiment appropriate for this government-owned *public benefit* corporation, tasked with running and maintaining the master plan of the capital city of Pakistan. Upon researching the CDA's establishment, I discovered a lineage of military leadership starting with General Ayub Khan and the organisation's first chairman, General Agha Muhammad Yahya Khan, who defined the charter of this organisation and its role in building Islamabad. This essay provides a preface to a longer discussion about public space in Pakistan by analysing perceptions of the ideal city, in popular and official discourse.

On a sweltering July day in Islamabad this year, images of bulldozers, riot gear, and protesting men, women and children dragged from their homes in a *katchi abadi,*poured into news circuits and social media. The CDA announced a successful removal of all illegal occupants from sector I-11, who posed (among other things) security threats and sanitation risks to the city. It is almost tragic that a government institution tasked with representing the 'people' of a city, could be responsible for the eviction of thousands of them from their homes, with no alternatives for resettlement.

Read more: http://herald.dawn.com/news/

Ann Seltman Smart ~ A Is For Architecture

A vintage film (mid-1960's) on the importance of architecture in everyday life.

Produced by Ann Seltman Smart, formerly of WPTF-AM in Raleigh, North Carolina. Narrated by Ted Daniel.

Climate Change: The Mother Of All Geopolitical Challenges ~ Interview With Graciela Chichilnisky

In this interview, Graciela Chichilnisky, a world leading economist and one of the major climate change forces in our era, talks about the reality of climate change science, the reasons why some corporate interests continue to deny the facts about it, and explains why climate change may represent the greatest geopolitical challenge facing humanity.

Marcus Rolle: Despite the international scientific community's consensus on climate change, there are still people who deny that climate change exists or that it is caused by human activity. In fact, some of those naysayers have been funded by corporate interests such as ExxonMobil, as revealed by Exxon's former in-houses climate change expert Lenny Bernstein. However, the evidence for global warming is overwhelming. Why, specifically, are some corporate interests bent on hiding the truth about climate change, and what's your opinion on the effects of global warming?

Graciela Chichilnisky: Some of the naysayers have been funded by corporate

interests as was revealed by Lenny Bernstein, the in-house climate change expert of Exxon. Lenny fought me tooth and nail in Kyoto during December 1997, while I designed and then wrote the Carbon Market into the United Nations Kyoto Protocol. At the end the carbon market prevailed and is now international law, and ironically it is now advocated by six of the largest oil companies in the world and this includes ExxonMobil.

Corporate interests are far reaching and they can permeate the entire economy and the politics of a nation as a whole. In the case of fossil fuels the situation is compounded by the central role played by energy in the economy. Fossil fuels are all about energy, and energy is the mother of all markets. Everything is made with energy, your home, your car, your food and the computer on which this article is written and read. For this reason the right to use fossil fuels is very basic and it is close to land's rights; as land's rights, the rights to fossil fuels can be the cause of wars. It is all about values. Some say that the right to fossil fuels is about the right to use the earth's resources, which were provided by God to humans, and they hold this as a human right whether or not burning fossil fuels can cause catastrophes and damage irrevocably the rest of the world.

Tackling climate change is like abolishing slavery. It is so deeply felt that it can cause wars. 150 years ago it was nearly obvious to everybody that slavery must disappear, because of basic human principles and of the most sophisticated arguments about freedom, civil rights and even economics. Yet 150 years ago the US fought a fratricide war that was the bloodiest in the nations' history, and tore the nation apart to defend the right to own slaves. The South lost, but it nevertheless attempted to resuscitate the war many times despite that.

US historians say that the economic value that is at stake from abolishing fossil fuels is about the same as the value that was involved in eliminating slavery in the US 150 years ago. The abolition of fossil fuels can destroy today the largest balance sheets in the planet: these are the balance sheets of the largest oil companies. It is not surprising that emotions and economic interests of that size run amok and cloud reason.

MR: You have said that climate change is the mother of all geopolitical challenges. Can you elaborate a bit on this?

GC: Climate change is all about the use of fossil fuels: over two thirds of the

world's CO2 emissions that cause climate change come from burning fossil fuels to produce energy. Fossil fuel energy is today the basis of industrialization, and its use since WWII is what is causing climate change. The period since WWII is when the world economy globalized, where the North and the South wealth gap increased deeply and became three times larger what it was before, when abject poverty led over 1.3 billion people to live below the level of satisfaction of basic needs, and on the brink of survival. The Bretton Woods institutions were created after WWII: the IMF, the World Bank, the WTO, and they were dominated by the US that become nearly 60% of the world economy after the destruction of Germany and Japan. The Bretton Woods institutions used financial tools, denominated in US dollars, to encourage and coerce 80% of the planet's population in the developing nations to follow a resource intensive form of economic development, leading to the over-extraction and exports of their fossil fuel resources and other important natural resources at the lowest prices ever – except perhaps for the prices we face today –and their overuse in rich nations. Fossil fuels are intimately connected with globalization – indeed they are the basis of the current wave of globalization. Fossil fuels are the basis of industrialization and they are traded through international markets: the international markets are dominated by rich nations, and these markets grew three times faster than the world economy as a whole since WWII. In these markets, poor nations that house 80% of the world population over-extract the earth's resources within their territory for exports, and export them at prices that are lower than replacement costs, leading to sustained poverty, while rich nations who house 20% of the world's population overuse the world's resources and benefit from them at very low prices. This implacable process has led to a 3x increase in the world's wealth gap between the poor South and the rich North since WWII. The image is just 20% of the world's population siphoning and overusing the great majority of world's resources. But the process has reached its natural limits: the increasing inequality between rich and poor nations in the world economy and the corresponding overexploitation of resources is the cause of the global environmental crisis of our times. It is threatening every nation in the world. Global environmental risks are worst for the poor nations, but every nation is at risk from the massive overuse of resources our lopsided economies and international trade policies of the Bretton Woods institutions caused. Climate change means the rise of the seas which has the same level all over the world. While the poor will suffer more, rich nations will suffer $trillions in economic losses, according to OECD reports in Paris, and will face massive immigration

flows that will threaten their institutions, as the Pentagon anticipates.

The geopolitical risks of climate change are now becoming evident: they include massive migration caused by extreme climate conditions entailed in climate change. Record droughts and floods are the most immediate consequence of climate change. Not surprisingly, the current war in Syria started after four years of extreme droughts that left people without jobs, without food and without hope. The result is a massive exodus into Europe – just one million people last year, with several more millions expected this year and the next. This developments is highly destabilizing. It leads to political fear and hate against the massive wave of immigrants. The fear of immigrants and refugees has become an everyday reality, with immigrants being demonized by the media and presidential candidates in Europe and the US alike. The fear is that immigrants will take away jobs, reshape the face of contemporary society, and be a source of violence and even terrorism. The fear of immigrants and refugees can cause nationalistic and even fascist tendencies, and provide the pretext for the emergence of authoritarian regimes in many advanced democratic nations in the world. In due time, such political scenarios can provide the source for the destruction of democratic institutions and the end of freedoms and liberties that took centuries to build and the excuse for the implementation of extreme political measures against minorities. In fact, they may lead to the reformulation of human civilized values as we know them. The ensuing political chaos can destroy civil societies even before the rising seas that are caused by the melting of the North and the South Poles swallow hundreds of millions of people and create global demographic chaos. This in a nutshell is why climate change is the mother of geopolitical changes today.

If this position seems extreme, consider that it is similar in many aspects to the position that the Pentagon itself has presented in official reports on the topic of climate change and national security risk during the last 8 years.

Why don’t we hear more about this in today’s political climate? Contemporary civil discourse avoids these issues because nobody seems to know what to do about it. It is a form of socio-psychological denial. Yet there are now technology solutions in the US that can resolve the problem and lead to a massive restructuring of our energy infrastructure. Such technologies and new infrastructure can also lead to economic boom. The main issue is redressing the economic and human value of a clean atmosphere, and of the survival of the human species. Despite the existence of solutions, enormous change in the

foundations of energy use and even capitalism as we know it, are very difficult to accept. Short term interests are key factors that stand on the way to clear reason.

MR: The latest attempt on the part of the so-called international community to tackle the climate change challenge took place in Paris in November-December 2015. What's your assessment of the climate agreement at COP21?

GC: The Paris COP21 climate conference has produced an agreement that has been hailed by world leaders as a development signifying "a turning point for the world," the end of the fossil fuel era. The truth of the matter, however, is very different. The Paris COP21 climate agreement is simply empty of action, and can be called hot air. We are no closer to averting a catastrophic climate change scenario than we were before the start of the Paris talks. In fact, this could be the biggest failure of the global climate negotiations in their 21 years of existence. It's an agreement that binds the signatories to nothing. My former colleague at Columbia University and from NASA, Professor James Hansen, a founding figure in identifying the risks of climate change, says the Paris agreement is "fraud." We spent billions of dollars and weeks of talks in Paris with no action items to show for it. Climate change is a tough problem that cannot be resolved by wishful thinking. Voluntary solutions never worked. We have 18 years of experience to prove this fact.

The so-called Paris agreement also makes no commitment to funding. Yet, funds are needed to transform the $55 trillion power plant infrastructure that emits 45% of the global emissions. There can be no solution to the climate change challenge without transforming the very infrastructure that is responsible for nearly half of the global emissions. The power plants upon which this infrastructure is based on operate through the use of fossil fuels and we need to move in the direction of clean power. This will also not happen through wishful thinking. Transforming the $55 trillion power plant infrastructure requires solid financial targets and actions. It is an extremely difficult to do, but it can be done – indeed we now have the financial political and technological solution to resolve climate change – but it cannot happen merely by wishful thinking. Magical thinking will debilitate us and undermine our ability to succeed. And what is at stake here is nothing short of the survival of human civilization as we know it.

MR: Some developing nations are concerned about restrictions on greenhouse gas emissions as they feel that such measures will hinder their own economic

development. In fact, they object to western moralizing about climate change since it has been the great western capitalist powers that have caused the problem of climate change. What will it take for developing nations to adopt clean energy power systems?

GC: It is possible with today's proven technologies to capture of CO2 directly from the atmosphere and at a very low cost – this is called direct air capture (DAC) technology. The CO2 can be utilized in valuable products to reduce costs. With this carbon negative technology™ one can build "carbon negative power plants"™ that produce energy while they clean the planet's atmosphere. These power plants can produce CO2 in a profitable manner, so the final product is more development with a cleaner atmosphere. In 2009 during COP15 in Copenhagen I created these technology concepts and the Green Power Fund a $200Bn/year fund to build such carbon negative plants in developing nations, which would derive funds ($200Bn/year) from the carbon market of the Kyoto Protocol (which was then trading over $175Bn/year). These plants can provide clean power to poor nations and suffice to build enough carbon negative power plants to clean the world's atmosphere and to promote enormous and much needed economic development in Africa, Latin America and the Small Island States. These nations can grow and they can clean the planet's atmosphere at the same time.

In Copenhagen COP15 I presented my plan to the US delegation, and the US State Department announced two days later a version of it in Copenhagen. This version was called a Green Climate Fund (one word was changed) and is now international law. But as its name indicates, the changes built into the new version – the Green Climate Fund – destroyed the connection with power plants that are the source of the problem, and the possible solution, and the connection to the carbon market of the Kyoto Protocol (this was because the US has been against the Kyoto Protocol since Lenny Bernstein of Exxon and other lobbyist in the US had their way).

The Green Climate Fund is now international law but it is handicapped by having no source of reliable funding, while its mother the Green Power Fund that I created had the UN carbon market to fund it, and the carbon market had enough resources to pay for the Fund's $200Bn/year. As a result of these disconnects, the new Green Climate Fund has never taken off. Despite good willing donations, it has no reliable source of funding and no clear objective beyond alleviating the worst outcomes of the climate change catastrophe.

We need to go back to the Green Power Fund because it can avert climate change altogether. On that financial basis we can now resolve climate change, using the new carbon negative technologies to build carbon negative power plants in the poor nations. It will take 15-20 years to overcome the worst part of the problem and it will cost US$2-3trillion to build as many carbon negative power plants as needed, but every cent can be recovered since carbon negative power plants are commercially viable, namely they pay for themselves: they cost less to build than the revenue they produce from the sale of the CO2.

This is a revolutionary transformation of the global political economy of the last two hundred years, including the dynamic that guides this century's globalization processes based on the extreme overexploitation of earth's resources – including the planet's atmosphere. But one must remember that that this plan needs new types of economic arrangements to succeed. It entails a transformation of capitalism.

Scientific computations show that all this can be self – financed: the CO2 captured from the atmosphere can be sold for use in food and beverages, fertilizers, greenhouses, enhanced oil recovery where appropriate, for clean fuels, building materials, fertilizers, carbon fibers, and more – there is a $1trillion market for CO2 on earth, and these products can eventually utilize and remove enough CO2 to eliminate the 38 gigatons of CO2 that humans put up every year into the atmosphere.

It this plan seems extreme, consider that it is what the Intergovernmental Panel on Climate Change says is needed now in order to avert catastrophic climate change.

MR: Are thresholds on greenhouse gas emissions sufficient at this stage in the game to prevent a catastrophic climate change scenario?

GC: No, the Paris Agreement has no thresholds, none. It has been said to have "no teeth" for this reason. The Kyoto Protocol mandatory emissions/ limits are the only thresholds we have, that we ever had, and they expire in 2020. We need to renew and extend the Kyoto Protocol thresholds as a matter of urgency and implement the carbon negative technologies that the IPCC requires, which are available and even profitable for removing carbon from the atmosphere. We must extend the Green Climate Fund to become the Green Power Fund to help

development in the poor nations, mainly China and India – and we must do this now. Time is of the essence.

MR: What type of strategies and tactics could activists and communities pursue to respond to the climate change challenge?

GC: This is a very important issue that requires immediate attention and political action. Once the solutions that are available become communicated and are well understood, the peoples of the world can help organize the actions needed through the UN COP meetings every year, and through communities, local and national organisms that can implement them. Political action is required. This is what democracy is all about.

This will happen once the solutions are better known. They entail carbon negative technology that removes the existing carbon from the atmosphere – as explained above and as indicated in the 5th Assessment Report — in order to avert catastrophic climate change.

But technology isn't magic. It does not occur in a vacuum. It will develop within appropriate socio-economic structures, within appropriate political and institutional facilities. Here is a good practical example: After World War II, the leading economies created the Bretton Woods institutions to replace war by trade, so that the human species did not spend itself in increasingly savage and destructive world wars. The Bretton Woods institutions were deliberately created to implement change. They succeeded, but had unexpected consequences: they cauased an enormous expansion of international trade and industrialization that created a lopsided world in which the rich nations that house only 20% of the human population consume most of the planet's resources and are now destroying the atmosphere, its bodies of water, and the complex web of species that constitutes life on earth.

The Bretton Woods institutions were the first global financial institutions created by humans, and they changed the world economy as they were meant to do. They were the brainchild of John Maynard Keynes but they were led by the USA, the largest economy in the world after WWII. The Bretton Woods institutions succeeded to such an extent that they led to the Anthropocene, a new geological period that overcame the Holocene, when humans are now the stronger geological force in the planet.

But we are now facing new, formidable challenges that carry far greater risks that the early postwar era. We need, therefore, to create new global institutions that provide a new view and radically new processes of economic progress, based on a harmonious relationship between humans and nature. The next transformation of the world economy requires new economic arrangements that re-value the earth's resources that we are destroying at an alarming and unprecedented rate. In addition to the global carbon market, that was created in 1997 and international law since 2005, we now need global limits in the use of water and biodiversity and economic arrangements that provide value for water and for biodiversity. Air, water and food are three basic needs without which humans cannot survive. Yet today clean air, clean water and biodiversity have no economic value. The global markets I propose for carbon, water and biodiversity will make these the largest economic assets in the world, as they should be. It can be seen that these environmental assets are mostly in developing nations, which house the world's largest environmental richesses. Because the atmosphere, the bodies of water and the world's biodiversity are global public goods, once we alter their use, the arrangements to use them will be completely different from the markets for private goods that we have today. For example, they would require more equity in order to achieve efficiency. These new global economic arrangements will transcend actually existing capitalism and will create a new economy in which the most important assets are the world's resources, equity is a foundational value, and equity as well as efficiency are closely linked, as they should.

Is this a dream or can this happen? If there is a future to human civilization it must happen, and it will happen. In a way it is already happening. The new generations know this and will rise to the occasion once we provide the awareness and the tools to build a new economic order that is actually attainable.

Welcome to the world of the future.

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Graciela Chichilnisky has published scores of books, including Saving Kyoto, and some 350 scientific articles in the world's most prestigious economics and mathematics journals. The Washington Post calls her an "A-list star" and Time Magazine a "Hero of the environment". In addition, Chichilnisky has made revolutionary contributions to the world economy – like creating the concept of Basic Needs and the UN Carbon Market.

Previously published: http://www.globalpolicyjournal.com/graciela-chichilnisky

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Op-Ed: We Are Deeply Concerned About South Africa's Current Course

A letter from THE OLIVER AND ADELAIDE TAMBO FOUNDATION, the NELSON MANDELA FOUNDATION and the AHMED KATHRADA FOUNDATION to the ANC NEC.

To: The National Executive Committee of the ANC

c/o The Secretary-General, Mr Gwede Mantashe

The Oliver and Adelaide Tambo Foundation, the Nelson Mandela Foundation and the Ahmed Kathrada Foundation jointly write to you at a difficult time in the history of the African National Congress and our country, South Africa. The ANC has been through challenging times before, but with the resourceful and courageous leadership the organisation has been blessed with in its long history, it can yet again provide an invigorated, visionary course into the future.

We are deeply concerned about the current course on which our country is headed. We believe this course is contrary to the individual and collective legacy of our Founders.

We read disturbing stories in newspapers and other media about "state capture"; we see important institutions of democracy such as Parliament under great strain; we hear what ordinary South Africans tell us through our work, and are challenged by friends and comrades who witness cumulative fragmentation of the ANC, a great organisation our Founders helped build and sustain over

generations. In the spirit of our Founders, we cannot passively watch these deeply concerning developments unfold and get worse by the day.

Leaders such as Tambo, Mandela and Kathrada helped shape the ANC by providing a vision of a better future for all our people. Their vision of freedom, social justice, and democracy was embraced by millions of South Africans. It was based on and driven by strong moral authority and principled engagement. Their leadership and that of the ANC were admired the world over. It inspired other people in their own struggles.

Read more: http://www.dailymaverick.co.za/deeply-concerned

Interview With Graciela Chichilnisky ~ Reflections Of An Innovated-Minded Economist

In this new interview, Graciela Chichilnisky, a world leading economist and one of the major climate change forces in our era, talks about growing up in Argentina and the legacy of the Peron revolution, her struggles with gender discrimination

in a male-dominated world of science, and the need to design new global institutions to address climate change.

Chichilnisky has published scores of books, including Saving Kyoto, and some 350 scientific articles in the world's most prestigious economics and mathematics journals. The Washington Post calls her an "A-list star" and Time Magazine a "Hero of the environment. In addition, Chichilnisky has made revolutionary contributions to the world economy – like creating the concept of Basic Needs and the UN Carbon Market.

Marcus Rolle: You were born in Argentine and your father was a minister in the Juan Peron government. What was it like growing up in Argentina at the time of the Peron reign?

Graciela Chichilnisky: When I was a child, Buenos Aires seemed a magical place at a magical time. Buenos Aires is a lively and beautiful city, people were interesting and intense. In reality, Buenos Aires then reminds me of New York now: a graceful old city full of live, intensity and culture. And the Argentine countryside is extraordinary – Patagonia is a huge empty land of glaciers, cattle, sheep, whales, penguins and pink flamingos. The peaceful beauty of the Atlantic Coast, the majesty of the snowy Andes that have some of the tallest mountains in the world, the Iguazu Falls in the North boundary with Brazil, the enormity of the Pampas, it was all magic.
My father was a Professor of Neurology at the University of Buenos Aires and a minister of Public Heath under Peron and he built hundreds of hospitals all over Argentina. He was the doctor of Eva Peron and a friend of Juan Peron, who admired him. I still have some of the letters that Perón hand wrote to my father. Life under Peron then was intoxicatingly eventful. Evita took on the landed oligarchy and stood firm with the "descamisados" – the shirtless. In reality Evita and Peron represented the industrial revolution while the landed gentry represented the Spanish aristocracy. Landowners vs shirtless. The land in Argentina is so enormously rich and fertile – comparable only to the Ukraine and the Great Lakes in the US – that Argentina in the 1950's was bound to become one of the richest countries in the world. But the forces of darkness won and there were coups d'etat that removed Peron after Evita's early tragic death, the military dictators made torture a staple and dedicated the nation to exports of natural resources such as wheat and meat. No industrialization and a war pitting the landowning oligarchs against the labor unions. This destroyed the social

advances of Peron and his intentions of industrializing Argentina. Even today a visitor can observe the industrial revolution that never happened. Eventually however and with the help of Margaret Thatcher – her best role perhaps – the military lost its prestige and was unmasked as brutal and incompetent and nowadays everybody is a Peronist. The recent presidential elections pitted one Peronist candidate against another. Even my spell corrector knows how to spell Peron and Evita and despite their errors they emerged as the heroes of the people – and the military-religious complex as the villains of the people. In a way the entire world now needs a Peronist revolution to counteract the enormous inequality of wealth that was created during the period of globalization and is destroying everything and the most basic human values along with the rest.

MR: At the age of 17 you went to the US to study at MIT as a graduate student under some rather unique circumstances. Would you relate the background of the events that brought you to the US?

GC: I was finishing high school when I started taking University courses without permission – there I met wonderful professors and students who opened my eyes to the world of science and mathematics – it was a great privilege. But towards the end of the 1960's and the beginning of the 1970's the military staged several coup d'etats and in one of them they closed down the University in Buenos Aires. One MIT professor who was there at the time, the famous Warren Ambrose, a well known Mathematician, decided to take 6 Argentinian students to MIT to continue their studies, since the University had been indefinitely closed down. All of them were graduate students who were taking doctoral courses in Mathematics – except for me who never went to college. MIT accepted me, a single mother without a college degree, as a Special Graduate Student in Mathematics and the Ford Foundation gave me a scholarship. After a year of very hard but enjoyable work I came on top of the Mathematics PhD class at MIT — and then I became an official PHD student in Mathematics at MIT. This led me to obtain to a PhD in Mathematics, and then another PhD in Economics at UC Berkeley – two PhDs to compensate for the fact that I never got a college degree!

MR: Was there something specific that attracted you to the study of mathematics and economics, or, being so gifted in these fields, was it just a natural direction to follow?

GC: I was most interested in sociology and philosophy, but could not make sense

of what professors and books were saying. Mathematics on the other hand seemed clear and simple, a natural way to think, a world without boundaries. Mathematics is the language that the brain uses to communicate with itself.

MR: You have been teaching for a few decades at Columbia University's Economics Department and held for many years the UNESCO Chair in Math and Finance. What specific areas in mathematics and economics has your work focused on?

GC: I am proud of the UNESCO Chair that the UN endowed for me in 1996 at Columbia, in recognition for the many years of service to the international community. UNESCO offered first the Chair for me to hold at Stanford University where I was teaching at the time, but I decided to go back to New York and Columbia University instead. I taught Mathematics and economics at Harvard University as well, after completing my PhDs, where I worked with Kenneth Arrow in his research projects. My topics in Mathematics are Algebraic Topology and Non Linear Analysis; in Economics I have done work in international trade, development economics, extensive work in environmental economics, on the economics of markets and social risk, economic theory including game theory, growth theory, the economics of networks and the economics of Gender.

MR: What do you make of the continuing claim or myth that women are not intellectually endowed as men are to pursue careers in mathematics and the sciences?

GC: This is a shameful myth that persists in our society and causes huge damage to us all. It seems incredible in the 21st century to have such totally unfounded and degrading statements made about any group in society – especially about women who are the pillars of human society. Recall what Larry Summers had said as President of Harvard University – i.e., that women are "genetically inferior in the sciences."' He did, yet he was made Director of the White House United States National Economic Council for President Barack Obama. If Larry would have said that about blacks, I feel pretty sure that he would not have been asked to serve as the adviser of President Obama. The discrimination and even hate against women is widespread in our society, particularly in a knowledge based society, where it is used to impede the participation of women in the creation of ideas and the highest pursuits. In our world physical size no longer matters, and therefore men no longer have an edge — but creativity and brainpower does. This

is a way to keep women down, degrading them in what counts. Several years ago, the Presidents of the top 9 Universities in the US publicly declared gender discrimination and hostility to be a most serious issue in their own Universities and promised to fight against it – but the trend persists specially in the fields such as Mathematics, Economics, Physics, which are at the top of the science heap. The American Association of University Professors published each year official University data on salaries by gender — showing the persistent continuation and seriousness of the gender discrimination in salaries in US Universities. For a long time, Columbia University had the dishonor of being the 2nd worst among all Ivy League universities in this shameful gender discrimination and hostility trend. I advise many women on this issue, having fought and won twice myself in Court against this illegal trend, and my heart goes out to them. I work with them, we persist. We will eventually win, but the damage, destruction and loss of international competitiveness for the US is a serious cost of this irrational gender bias. We all have to work together to overcome this bias, men and women. Same with racism, which is still deeply entrenched in many aspects of American life.

MR: You have met professional adversity in the pursuit of your academic career, which is part of the reality of the academic world. Do you believe the adversity you have faced was due largely to your gender?

GC: Yes. But it was not the only factor. Innovation is often met with hostility in well organized and successful intellectual and academic networks, as the ones that exist in the US. Partly due to my background, my work has always been a bit different- as has my life, and innovation has been my trademark. But one thing is clear. While striking innovation is met with aggressiveness and hostility in academia, for men and women alike, what men do to innovative women exceeds in scope and ferocity what they would do to other men. It is like rape – a way to try to control a group by intimidation. Think of it this way – Larry Summers would not have dared say in public that blacks are genetically inferior in the sciences – would not even talk about this topic no matter what he thinks. With women, everything goes. He felt no fear in making a totally unfounded degrading statement in public about women. Why? Because the ferocity with which women are treated is of a totally different order of magnitude, everything goes**.**

MR: You have been for many years one of the leading forces in climate-change efforts. How do we define climate change?

GC: Climate change means a major shift in climate patterns, such as dramatic increase in violence, frequency, length, and severity of climate events, including superstorms, tornadoes, typhoons, major floods and long severe droughts, and other climate related environmental disasters. These events increase both in intensity and frequency as the energy in the atmosphere increases, which occurs when the mean temperature increases. Climate change means also dramatic changes in long term climate patterns such as desertification, the alteration or the reversal of major ocean currents, changes in the sea level, melting of the planet's polar caps, glacial periods.

MR: What would you say are the most obvious facts that climate change is taking place and that he global mean temperature is driven up by human interference?

GC: The statistical evidence conforms to the definition just provided: the planet's polar caps are indeed melting, and the sea levels are indeed rising. This has been measured and is directly observed. We have increasingly violent, frequent, lengthy and severe climate events, major floods and unusual severe droughts that do not correspond statistically to standard deviations from the mean. Thousands of scientists from all over the world who report to the United Nations Intergovernmental Panel of Climate Change (IPCC) have come to the conclusion that changes in temperature are associated with changes in the concentration of greenhouse gases, of which the main one is CO2, and that mean temperature is increasing due mostly to the burning of fossil fuels – coal, natural gas and petroleum -– for economic purposes: industrialization.

MR: It has been said that we must work towards keeping temperature from rising above 1.5C. Is this a safe operating space? And how can we be sure that temperature won't rise much higher than that?

GC: We definitely need to try to keep below a 1.5C increase in mean temperature. All the changes we measure today occurred with just 1C increase above the last century. An increase above 2C is catastrophic according to the IPCC – meaning that the climate change disasters described above become frequent and the situation irreversible. Catastrophic changes will move the planet to another climate regime altogether – the point of no return. This happened in the planet Venus where the concentration of CO2 in the atmosphere is huge, and now Venus cannot house life as we know it. However, staying within a 1.5C increase is very hard, because we emitted so much CO2 and we have procrastinated so long in

reducing fossil emissions. In fact, this is so hard that it is actually impossible according to the UN IPCC in most scenarios – unless we actually remove the CO2 that is already in the atmosphere. This is called "carbon negative technology"™ and it exists and can be utilized to effectively reverse the damage we have done. It would be a major global change, which can only be realized if we organize ourselves and the financial system to build "carbon negative power plants"™ to satisfy the desperate need for energy to fight poverty in nations such as China and India. These are power plants that capture more CO2 from air more than what they emit, about twice as much. These plants exist. They are possible. We need to build thousands of carbon negative power plants, mostly in poor nations that need them most, and these will suffice to clean up all the CO2 that humans are emitting every year into the atmosphere, which is about 38 gigatons of CO2. It seems difficult to do and it is – but economics is on our side. The capture of CO2 from air is now economically feasible, it costs less than the price that markets pay for CO2, so in reality carbon negative power plants are an economic reality, they are commercially feasible. We just need project finance to get this done. Where will the project finance come from? The Green Power Fund (GPF) I proposed in Copenhagen in 2009, which was partially adopted and became international law with the name Climate Climate Fund (a one word change). The GPF derives its funding from the carbon market of the Kyoto Protocol which by 2011 was trading about $175 billion a year – enough to offer the project finance needed to build the carbon negative power plants that will clean the planet's atmosphere. All that is required is to build a financial institution – the Green Power Fund – that systematically offers debt finance for carbon negative power plants in developing nations, and circulates the revenues so they are used to build new such plants. This is certainly not beyond our financial abilities. In 15-20 years, climate change can be resolve at a total aggregate cost of $2-3 trillion, which is less than 5% of the planet's GDP in a single year. Spread over 20 years, the financial burden of debt finance reduces to about 0.25% of GDP. But in reality it is no burden since the carbon negative power plants are commercially viable, they produce revenue. And the initial money can be obtained from the carbon market of the Kyoto Protocol and its CDM. It is true that, as the architect of the Kyoto Protocol Carbon market I have an undeniable sympathy for the carbon market. But think of it this way. We all know that we need to reduce emissions of CO2, and simply by agreeing on mandatory emission limits, the carbon market can function – that is how it functions – and produces enough money to terminate the catastrophic threat of climate change. And to eliminate or alleviate poverty in the poorest

nations of the world, who then become great consumers for the rich nations' exports. The circle closes. We just need to do it, nothing to lose and a lot to gain. And if we do not do it, we face catastrophe. It seems impossible to argue against it given the current technologies and what they have already demonstrated that they can do.

MR: In addition to your involvement in the climate-change efforts, you have been leading a campaign for the creation of something called a New Green Breton Woods system. What's all this about?

GC: Yes, this is a crucial issue. Globalization has totally changed the world economy since the mid- 1950s. World trade increased 3 ½ times more that the growth of the world's GDP. At the same time, the wealth gap between North and South increased deeply and became three times larger what it was before, when abject poverty led over 1.3 billion people to live below the level of satisfaction of basic needs, and on the brink of survival. The institutions that govern the global economy – the so-called Bretton Woods Institutions such as the IMF, the World Bank the WTO were created in the 1950's and have not changed since then. This is a recipe for disaster –it is like driving in a fast highway with a horse cart. Not fair for the horse, not effective for us, unlikely to succeed — and plain dangerous for all!

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Graciela Chichilnisky is Professor of Economics and of Statistics at Columbia University and Visiting Professor at Stanford University, and was the architect of the Kyoto Protocol carbon market. *Marcus Rolle* is a freelance journalist specializing in environmental issues and global affairs. He studied sociology and journalism at SUNY Binghamton and at the University of California at Santa Barbara.

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Climate Change And The Future Of The World: An Interview With Graciela Chichilnisky

In this highly insightful interview, climate change authority and leading economist Graciela Chichilnisky *talks about the catastrophic threats that climate change pose to the future of the world if we fail to coordinate global actions aimed at the curbing of emissions and the removal of carbon dioxide from the air through the revolutionary technology available. Professor Chichilnisky also argues, however, that technology isn't magic, and that what is required for tackling global warming with carbon negative technologies are fundamental changes in the way the global economy and its institutions have functioned in the post-war era.*

Marcus Rolle: You have been for many years one of the leading forces in climate-change efforts. How do we define climate change?

Graciela Chichilnisky: Climate change means a major shift in climate patterns, such as dramatic increase in the violence, frequency, length, and severity of climate events, including superstorms, tornadoes, typhoons, major floods, and long severe droughts, as well as other climate related environmental disasters. These events increase both in intensity and frequency as energy in the atmosphere increases, which occurs when the mean temperature increases. Climate change also means dramatic changes in long term climate patterns such as desertification, the alteration or the reversal of major ocean currents, changes in the sea level, melting of the planet's polar caps, and glacier periods.

MR: What evidence do you think supports the argument that climate change is taking place and that the global mean temperature is driven up by human

interference?

GC: The statistical evidence conforms to the definition just provided: the planet's polar caps are indeed melting, and the sea levels are indeed rising. This has been measured and is directly observed. We have increasingly violent, frequent, lengthy and severe climate events, major floods and unusual severe droughts that do not correspond statistically to standard deviations from the mean. Thousands of scientists from all over the world who report to the United Nations Intergovernmental Panel on Climate Change (IPCC) have come to the conclusion that changes in temperature are associated with changes in the concentration of greenhouse gases, of which the main one is CO2, and that mean temperature is increasing due, for the most part, to the burning of fossil fuels – coal, natural gas and petroleum -– for economic purposes: industrialization.

MR: There is still resistance in various corporate and political quarters about the facts regarding climate change. Why is that?

GC: Above all, climate change means change. Big change. Enormous change. And there is always resistance to change. The image is a large ostrich sticking its head in the sand: denial of change. Climate change is particularly resisted or denied because it is directly connected to the use of energy, which measures economic growth today. The fear is that climate change will impair progress and economic growth by requiring we stop burning fossil fuels. Of course, economic growth may occur without burning fossil fuels, but in the last century and a half, economic growth meant burning fossil fuels (today, there is a tight statistical connection between the level of a nation's development and the amount of fossil fuels it burns). The same phenomenon happened in the US when slavery was abolished. The fear was that it would impair economic growth, since slaves represented energy and energy is the mother of all markets and the way we measure today economic growth. The connection is spurious. Equally, we can grow more and much better when we use solar energy – the sun after all is the source of all energy in the planet. In fact, fossil fuels are nothing else than solar energy canned in liquid form. But denial, and its cousin, lack of imagination, are powerful forces, they can cause wars and immense destruction. Humans are particularly prone at destruction that is unnecessary and occurs solely due to lack of imagination. The image is human life as a play written by an idiot full of sound and fury and signifying nothing. This is not an exact description of human life, of course – there are exceptions – but is not far off.

MR: It has been said that we must work towards keeping temperature from rising above 1.5C. Is this a safe operating space? And how can we be sure that temperature won't rise much higher than that?

GC: We definitely need to try to keep below a 1.5C increase in mean temperature. The changes we measure today have occurred as a result of just a 1C increase above the last century. According to the IPCC, an increase above 2C is catastrophic, meaning that the climate change disasters described above become frequent and the situation irreversible. Catastrophic changes will move the planet to another climate regime altogether – the point of no return. This happened in the planet Venus where the concentration of CO2 in the atmosphere is huge, and now Venus cannot house life as we know it. However, staying within a 1.5C increase is very hard, because we emitted so much CO2 and we have procrastinated so long in reducing fossil emissions. In fact, this is so hard that it is actually impossible (according to the UN IPCC, in most scenarios) unless we actually remove the CO2 that is already in the atmosphere.

This is called carbon negative technology and it exists and can be utilized to effectively reverse the damage we have done. It would be a major global change, which can only be realized if we organize ourselves and the financial system to build carbon negative power plants to satisfy the desperate need for energy to fight poverty in nations, such as China and India. These are power plants that capture more CO2 from air more than what they emit, about twice as much. These plants exist. They are possible. We need to build thousands of carbon negative power plants, mostly in poor nations that need them most. These will suffice to clean up all the CO2 that humans are emitting every year into the atmosphere, which is about 38 gigatons of CO2. It seems difficult to do but the economics are on our side. The capture of CO2 from air is now economically feasible, it costs less than the price that markets pay for CO2. Carbon negative power plants are an economic reality, they are commercially feasible. We just need project finance to get this done. Where will the project finance come from? The Green Power Fund (GPF) I proposed in Copenhagen in 2009, was partially adopted and became international law with the name, Climate Climate Fund (a one word change). The GPF derives its funding from the carbon market of the Kyoto Protocol which, by 2011 was trading about $175 billion a year; enough to offer the project the finance needed to build the carbon negative power plants that will clean the planet's atmosphere. All that is required is to build a financial

institution – the Green Power Fund – that systematically offers debt finance for carbon negative power plants in developing nations, and circulates the revenues so they are used to build new such plants. This is certainly not beyond our financial abilities. In 15-20 years, climate change can be resolved at a total aggregate cost of $2-3 trillion, which is less than 5% of the planet's GDP in a single year. Spread over 20 years, the financial burden of debt finance reduces to about 0.25% of GDP. But in reality, it is no burden since the carbon negative power plants are commercially viable and produce revenue. The initial money can be obtained from the carbon market of the Kyoto Protocol as well as its CDM.

It is true that, as the architect of the Kyoto Protocol Carbon market, I have an undeniable sympathy for the carbon market. But think of it this way. We all know we need to reduce emissions of CO2, and simply by agreeing on mandatory limits, the carbon market can function – that is how it functions – and produces enough money to terminate the catastrophic threat of climate change. Also, to eliminate or alleviate poverty in the poorest nations of the world, who then become great consumers for the rich nations' exports. The circle closes. We just need to do it. There is nothing to lose and a lot to gain. And if we do not do it, we face catastrophe. It seems impossible to argue against it given the current technologies and what they have already demonstrated that they can do.

MR: According to the Paris COP21 agreement, no action will be taken until 2020, and even that is entirely voluntary. What do we do in the meantime, continue to release unlimited greenhouse gas emissions into air?

GC: In Marrakesh, where COP22 will take place, we need to create the Green Power Fund just described, as was proposed in detail in 2009, and to start building carbon negative power plants in the world's poorest nations. I also have a negotiating methodology in mind that works. We need universal agreement on carbon emission limits that extends the Kyoto Protocol emission limits, so the carbon market can function and provide the funding needed to clean the atmosphere. As everybody knows, this has proven impossible so far. But don't fret. We can start now with "conditional mandatory emission limits" that everybody can, and will, agree to. This is also possible due to carbon negative technology. The industrial nations can make their mandatory limits conditional on the use of technologies that increase economic growth (these are possible now as described above). Also, developing nations can make their mandatory emissions limits conditional on the funding for debt finance provided by the Green Power

Fund. These conditional mandatory limits are acceptable to every nation and do the job. On the basis of such mandatory emissions limits, the carbon market will function and will provide the funding needed to clean the planet's atmosphere. This is the value of global finance, and is an update of the Bretton Woods institutions that work for the 21st century.

MR: You have said that climate change is the mother of all geopolitical challenges. Given today's Europe massive refugee migration crisis, which is partly contributed to climate change, how much more severe could the migration problem become because of climate change?

GC: It is generally believed that this year and the next will see massive migration of tens of millions of people around the globe due to climate change. In their reports, the Pentagon views this situation as one of the major challenges of national security in the U.S. This is also the type of challenge that brings on the worst fears for voters, and causes xenophobic tendencies in a year of presidential elections. The concern expressed right now by the established leaders of the Republican Party is that democracy is at stake, and that fears of massive migration gets transformed into hate and anti-American expressions and policies against the migration of specific racial or ethnic groups, such as those of Muslim origin. Climate change may be the geopolitical factor at stake in the most disconcerting and feared presidential election phenomenon of this year, the successful stream of apparently irrepressible election victories by Donald Trump.

MR: Scientific reports have noted that we must go back to 15 million years to find carbon dioxide levels as high as they are today. You are advocating sucking CO2 out of the atmosphere as part of the climate solution. How effective is today's state of carbon negative technology in cleaning up the air, and is there a market for it?

GC: Direct air capture or carbon negative technology – such as the version that is commercialized at present by Global Thermostat – is proven. It is operational in Silicon Valley at the famous technology campus SRI on Ravenswood Ave in Menlo Park, where the Internet first transactions were carried out, and it is ready to be deployed and scaled up globally. A good question is what to do with the CO2 once it is captured. Is there a market for it? The answer is as good as the question: CO2 is used to produce carbonated beverages such as Coca Cola and Pepsi, dry ice for McDonalds, it can be used to produce carbon fibers that replace metals in

most automobiles, is used to mix with hydrogen in order to produce economically clean synthetic fuels that are molecularly identical to gasoline but do not emit CO2 in net terms, to desalinate water, to produce clean and safe fertilizers that do not poison the soil nor the water, and even to mix with cement to produce stronger and lighter building materials at lower costs. The use of CO2 for building materials can sequester on earth enormous amounts of CO2, soon enough to absorb all the CO2 that humans emit into the atmosphere today, about 38 gigatons per year. We still need to reduce emissions of CO2 to make all this possible, both reducing emissions and carbon removal is needed. But there is a solution today. We just need the organization and will to do it. It can be done. And we will all be better off, as the financial structure proposed here will help redress the enormous cruel and destructive inequality of wealth in the world economy, and the inhuman poverty levels that prevent the satisfaction of the most basic needs of over a billion people in the planet's population.

MR: Why do you think there is skepticism and resistance among certain environmental groups to a ""techno-fix"" of the climate change problem?

GC: It has been said that the radical left is against a technology solution to climate change. The term "techno fix" is a dead giveaway: the fear is the "moral hazard" created by an artificial solution that makes it possible to continue sinning namely continue overusing the earth's resources, such as fossil fuels, and in the process polluting the planet's atmosphere in an unsustainable and destructive way. Put this way, I tend to agree with the concern, even though I co-invented myself the most advanced carbon negative technology that exists today the Global Thermostat direct air capture technology – and even though I founded the firm to commercialize the technology as well.

We need change; we cannot just use technology to continue our destructive and unsustainable use of the world's resources. But there is a secret that I am pleased to share with the reader: technology does not exist in a vacuum nor can it be expected to be our robotic slave. Technology will change us, it will change everything. Moral hazard is a mythological construct. We cannot control technology but if it imitates nature, if it is harmonious with nature, if it is based on the most fundamental virtues of human societies, compassion hope and humility, it can become one with our harmonious development as an artificial organism that reinvents itself on planet earth. I cannot promise redemption but closing the carbon cycle, bringing down every molecule of CO2 that we are

putting up simply reproduces the wisdom of nature: everything is a cycle. And alleviating abject inhuman poverty is a key to redemption if any exists. I say we do not have a lot of choices anyway: let's do it.

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