Converting from Weapons to Wealth:
The Unexplored Solution for Climate Change Funding

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INTRODUCTION

Climate change is drastically altering our environment - this reality is confirmed both by irrefutable scientific consensus and by emphatic environmental warning signs. As a result, society is now acknowledging that climate change is indeed a consequence of our own reliance on greenhouse gas (GHG) producing energy sources and that we must, therefore, create the solution.

Technology now exists for efficient, renewable energy to replace non-renewable energy technology and inefficient practices. Various international political and economic agreements with the potential to drive such a change have already been assented to. Due to political reticence and vested interests, however, these tools are not being effectively implemented and non-renewable fossil fuels remain at the epicentre of the global energy portfolio.

This situation is illogical, particularly when the role energy plays in generating international conflict is considered. Historically, control of resources has been a central motivation for many of the world's wars, and with oil reserves dwindling, and other natural resources depleting through climate change, this motivation for conflict will only increase.

Non-renewable resources, war, and climate change are thus linked in a self-perpetuating cycle, each fuelling the other, driving society on a self-destructive course. The need for a global switch to clean and renewable energy is increasingly urgent but this simple logic continues to be denied. A lack of global political will to support the economic viability of the renewable energy industry (a political attachment to entrenched economic systems) is keeping it from gaining the necessary traction.

Instead, industries of war presently dictate the balance of economic and political power. War absorbs billions of dollars annually - in 2007 world military expenditures reached a record US$1,339 billion[1] - and consequently the international arms industry booms with resources, expertise and jobs.

This torrent of misused resources must be redirected to creating a viable alternative economy, infinitely more constructive, based on renewable energy. A buoyant renewables industry would gradually provide the means to address climate change and to meaningfully implement existing international agreements. It would also remove the pressure of the current drive for non-renewable resources thereby diluting the associated causes of conflict. This would in turn create an atmosphere more conducive to effective implementation of existing peaceful conflict resolution.

The logic is clear. While this may require a radical change in the global economic structure, the change is entirely achievable and simply calls for committed international cooperation in order to make it a reality.

PART I: GLOBAL CRISIS – IMPETEUS FOR CHANGE

Ending decades of debate, the recent issue of two authoritative reports; the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report[2] and the Stern Review on the Economics of Climate Change[3], have finally led to an effective consensus that climate change is occurring.

Greenhouse Gases and Energy Consumption

Scientific data confirms that increasing GHG emissions are trapping heat in the atmosphere and causing the process of global warming to accelerate far in excess of historic climatic variability. It is collectively acknowledged that these excess GHGs are being generated by human activity, as a direct result of the "dirty" energy technologies upon which society currently relies for its transport, heating and cooling, and electricity needs. Human society is currently producing a yearly average of 4.28 tons of carbon dioxide (CO_2) emissions per capita with the United States producing almost five times that amount[4]. The burning of fossil fuels is responsible for 80.2% of those emissions[5], and a significant part of these figures is also attributable to inefficient energy use. Energy use has grown rapidly throughout the industrial age and continues as society pursues the ubiquitous goal of economic growth. Traditional national product statistics do not include environmental and social costs, but modern holistic calculations show that such "economic growth" is in fact mal-development, producing a negative trend in many countries[6].

Peak Oil
While energy consumption increases, the limited oil stocks on which society currently relies are decreasing, and some experts say that 'peak oil' has already been reached[7]. More conservative estimates state that while non-OPEC oil production is at plateau, production in OPEC countries will rise modestly but peak before 2030[8]. In any case oil production decline-rates are certainly accelerating worldwide, now between 6% and 10%. The world market reflects a serious imbalance between supply and demand and society is now experiencing the most dramatic oil price fluctuation ever witnessed. The dramatic spike in oil prices in 2008 pushed up the cost of commodities dramatically and put huge pressure on industry and private households, and although oil prices are now dropping, commodities will not follow.

Food crisis
A global food crisis is also gripping the world, and in June 2008 corn prices reached record levels in a 120% increase from 2007. Linked directly by many to oil price rises, it is the combined result of various economic and environmental factors. Desertification and the decreasing availability of fresh water[9] are threatening agriculture, and increasing sea water temperature and acidity through CO_2 absorption is also damaging the marine ecosystem and depleting fish stocks.

The recent drive for development of biofuels has compounded the problem. Initiated to combat global warming, it has now become apparent that the diversion for biofuels of precious forested areas and land used for food production is creating environmental problems faster than solving them and is further exacerbated by crop market speculators.

Financial Crisis
As a result of a culture of unrestrained profit chasing and short-sighted financial manouvering, the world is now in grips of a major financial crisis. It demonstrates the urgent need to reassess global priorities and must be treated as an opportunity for transformation of global economic structures, not as an excuse to retreat from progressive commitments[10]. In real terms the financial impact of ecological damage caused by GHG emmissions is far greater than the $3,000 billion estimated loss from the current crisis however this is not reflected in the scale and urgency of the respective global responses.

Weather Precipitations & Natural Disasters
The effect of decades of emissions from "dirty" energy sources is increasingly evident as the gradual alteration of the established ecological balance produces devastating consequences. Catastrophic weather events such as the Indian Ocean Tsunami of 2004 which left more than 150,000 people dead or missing and millions more homeless in 11 countries and Hurricane Katrina which devastated the Gulf Coast of the Southern United States in 2006 are alarming examples of the the threat that global warming poses to human life. Global warming will continue to amplify environmental extremes leading to flash floods, the expansion of dry zones and the degradation of ecosystems. Drought an desertification threaten the livelihood of over 1 billion people in over 110 countries around the world, including large areas in the European Mediterranean which are already facing severe and irreversable degradation.

Global Warming
Based on current trends, global temperatures are set to rise by as much as 6°c in the long term. However, with such dramatic effects already visible, and innumerable minute ecological changes underway, scientists agree that society cannot survive an increase of more than 2°c above 1990 temperatures[11]. In order to prevent that increase, developed countries as a group would need to reduce their emissions to below 1990 levels by 2020 and to still lower levels by 2050, even if developing countries make substantial reductions. The safe level of atmospheric CO_2 is no more than 350 parts per million (ppm) and with the amount of CO_2 already at 385 ppm and rising about 2 ppm per year, drastic mitigation measures are needed immediately and must be coupled with adaptation measures.

Glacial / Permafrost Melt & Sea-Level Rise
Perhaps the most visually affronting sign of climate change is the unexpected rate at which glacial retreat which is taking place, and though West Artic and Greenland ice sheets are slower to respond at first, once started, the result of the melting of these 2 mile thick masses will be significant. Scientists agree that it is only a question of time.

As well as damaging biodiversity as delicate interdependancies collapse, melting will cause a predicted sea level rise of between 2 and 5 metres within this century[12]. If this is allowed to happen, many island nations such as the pacific island of Tuvalu[13] and coastal cities such as the borough of Manhattan, New York, would disappear from the map. With two thirds of the world's major cities located in coastal areas, every centimetre of sea level rise means 1 million people displaced[14]. A rising water table is already affecting low-lying countries such as Bangladesh and in The Netherlands measures are already being taken in response to this threat[15]. Inland communities also, which rely on annual glacial melt water are already suffering the loss of that resource due to global warming.

Migration/ Urbanisation

The effects outlined above will be felt most severely in developing countries however less affected communities will face the inevitable influx of between 25 million and 1 billion[16] "environmentally induced migrants"[17] from areas effected by natural disaster, rising sea levels and food and water shortages. A population explosion in these cities will mean a massive strain on infrastructure: supply of water, power, transport, communication and waste management. As well as further exacerbating global warming by generating huge amounts of additional heat and emmissions[18], an inevitable consequence of this pressure will be social degradation. In this context, the conditions for effective governance, essential for restructuring of our energy and economic systems to combat climate change, will also be undermined. Indeed, no solution can emerge without a new style of energy governance wherein energy users participate in the decision making process[19]. Instead, these conditions will fuel social and economic tensions that could provoke conflict within communities.

PART II: ENERGY SECURITY = POLITICAL SECURITY

War for Resources

While human conflict is motivated by a variety of concerns, one of the most significant is competition for resources. It has been clearly stated that when the militant janjawids attack a village in Darfour control of water resources is part of the motivation[20]. This will be increasingly true as the above-mentioned impacts of climate change further reduce resource availability. Society's energy consumption combined with reliance on non-renewable resources for that energy has massively elevated their economic and political value. As a result the struggle for control of fossil fuels has been a central motivation for many of the world's expansionist policies and major wars, the most recent example being the current war in Iraq. As energy consumption continues to increase and resources to deplete, competition for their control is likely to generate greater international conflicts[21].

Reliance on non-renewable resources not only places society in conflict with its environment, but also generates conflicts *within* society and it becomes clear that environmental degradation and war are inherently linked.

Further Environmental Damage through War

War itself, whatever the motivation, not only causes thousands of civilian and military fatalities, but also exacerbates climate change, both directly and indirectly. Directly, the mechanics of war lay waste to the immediate area of conflict and consume huge amounts of dirty fuels in weaponry and transport.

The indirect consequences of war are equally devastating. Like environmentally induced migration, war massively undermines social stability, disintegrating public order and infrastructures. It similarly undermines the conditions for the governance needed to redirect society away from war and its causes. The energy sector reforms which are essential to address both conflict and climate change require a degree of concerted political attention which cannot be afforded in a wartime context. Thus, the destructive cycle continues as human conflicts, motivated in large part by environmental imbalances, further degrade the mechanisms for addressing them.

The Cost of War

Conflict is a massive drain on society's financial resources. In 2007 world military expenditures reached US$1,339 trillion, which represents an increase of 45% since 1998[22]. The United States accounted for 45% of that figure, and the cost of the Iraq war alone is predicted to increase to roughly US$3 trillion before the conflict is 'resolved'. The danger of massive national debt generated by war is evident in the financial crisis, which began in the United States, and any re-evaluation of the global financial system must include reduction of global economy's investment in destructive industries of war.

Industrial Interests Supporting War

The continuation of a culture of war despite its glaring counter-productivity is tied to the economic significance of the international arms industry. This self-perpetuating industry plays an integral role in the world economy and it is no coincidence that the top five arms manufacturers, USA, Russia, UK, France and Germany are also the five most powerful economies in the world[23]. In 2006 these countries sold US$315 billion worth of arms, although this accounted for only 85% of total arms transfers that year[24]. This represents an 8% increase from 2005. Associated post-war reconstruction industry also generates vested interests internationally.

PART III: THE NECESSARY TRANSFORMATION

Considering climate change and conflict together, a logical solution to these two major international issues presents itself. The vast sums of money and human resources which are currently flooding into non-renewable energy and into the arms industry supporting war must be diverted to development of an equally profitable economy based on renewable energy and eco-development, with the potential to address climate

change and encourage conflict prevention.

There is a misconception that renewable energy is expensive and uneconomic. In fact, if the funds currently flooding into non-renewable energy were redirected into renewable energy production, the long-term return would massively outstrip that of non-renewable energies.

The Cost of Non-Renewables

Nuclear energy is currently being promoted by many as a solution to climate change, but it manifestly is not. It produces masses of toxic nuclear waste for which no acceptable disposal solution has been found, and the plants themselves are highly volatile, at risk of security breach or full scale meltdown[25]. In addition, nuclear power is the most expensive form of power generation available, costing twice as much as wind power, even before costs of waste disposal and insuring against disasters are taken into account. The proliferation of nuclear technology in the name of power generation inevitably spreads the capability to produce nuclear weapons[26], a danger evidenced by India, which, while continually developing her nuclear programme, refuses to sign the Nuclear Non-Prolifieration Treaty.

Over the years huge amounts of public money and tax subsidies have been allocated to develop and encourage the production and use of non-renewable energy. These supports take many shapes and contribute to lowering costs of production or prices to consumers. "In 2001, energy subsidies in the European Union were estimated at €6.3 billion to the coal sector, €8.7 billion to the oil and gas sector and €2.2 billion to the nuclear sector"[27]. Simultaneously subsidies on energy consumption reached an annual rate of US$310 billion in non-OECD countries in 2007[28].

Nevertheless, millions of people are still living in energy poverty and in sub-Saharan Africa about 2/3 of households do not have access to electricity.

The worldwide decline in oil production rates is outstripping the effects of ongoing investment and subsidy current in place supporting the industry. Massive investments, recently estimated by the International Energy Agency at $350 billion per year, are now required in order to offset declining production. Put another way, 1mb/d of additional capacity - equal to the entire capcity of Algeria today - needs to be added each year[29].

Comparative Energy Potential of Renewables

Alternative technology for energy saving and generation from the vast capacity of renewable technologies such as solar photovoltaic, wind, geothermal is already extremely advanced and often economically viable. In 2005 renewables contributed to just 11.9% of global energy consumption with the above-mentioned sources accounting for only 0.6% of that amount[30]. Although renewables could therotically satisfy *all* our energy needs, with "realistic" institutional adjustments, meaningfully implemented, these technologies could provide 40% of global electricity by 2030.

Solar Photovoltaic:

In one hour, enough sunlight strikes the earth to satisfy the entire planet's energy needs for one year. This technology is immensely under utilised but a recent scientific breakthrough[31] means solar photovoltaic technology could be harnessed, stored and transported for household use even in long periods without sunlight. It has huge potential for bringing power to the thousands of energy-poor communities in Sub-Saharan Africa and other regions where this valuable resource exists in abundance, unutilised.

Wind Power:

Wind power also has massive energy potential and is being increasingly pursued to great effect in many countries. In Germany renewables are proving their economic potential also, with the Renewable Energy Sources Act 2004[32] dedicated to increasing the percentage of renewable energy in german power supply to at least 20% by 2020. As a result Germany's renewables industry currently generates US$240 billion in annual revenues and employs a quarter of a million people. The German wind power industry alone created 8,000 new jobs in 2007 and it is projected that by 2020, renewables industry will overtake the automobile industry. In France wind power has the potential to provide 23% of energy needs, and the market should be supported by transitional incentives.

Full integration of a mixture of all available renewable resources, would ensure global energy security and the switch to sustainable development does not mean zero economic growth. The long term cost-effectiveness of renewables would gradually repay inital investments and ultimatly create surpluses where non-renewables create debt. A change in perspective is required, to integrate environmental and social imperitives into economic evaluation, and initiatives such as the 'Global Compact' launched by Kofi Annan several years ago expanded.

An information boost is needed to educate industry about the economic possibilities of renewables, coupled with incentives to attract investment in research and deployment. Policies to improve market functioning

and removing non-economic barriers such as grid access, practical training and social acceptance[33] will also be required.

PART IV: MECHANISMS FOR TRANSFER

Redirecting Military Funding

It has been said that the cost of inaction on climate change could lead to losses of up to $3,000 billion[34] or 20% of global Gross Domestic Product (GDP)[35]. In a recent statement, Achim Steiner, Executive Director of the United Nations Environment Programme (UNEP) and board member of the UN Principles for Responsible Investment linked the crises of 2008 to "a wider market failure triggering ever deeper and disturbing losses of natural capital and nature-based assets coupled with an over-reliance of finite, often subsidised fossil fuels". He acknowledged that; "the flip side of the coin is the enormous economic, social and environmental benefits likely to arise from combating climate change and re-investing in natural infrastructure"[36].

Renewable technologies require a massive injection of political support and appropriate funding to compete with non-renewables for profitability[37]. While military expenditure absorbs 2.5% of the global annual GDP, the funds needed to effectively integrate renewable energy into the global economy have been estimated between .55%[38] and 1.6%[39]. These funds should be redirected on a global scale from destructive energy, military and arms industries to foster eco-deveoplment and a global "Conversion Fund" should be established in order to facilitate this. Converting a destructive industry into a productive industry, investment in renewable energy generation and eco-development will bring positive environmental and social returns for communities as well as economic returns through large savings on energy bills.

As part of a broad programme of addressing the effects of climate change on the developing world, local level projects using innovative renewable solutions, such as the Pintadas project in Brazil run by NGO 'SouthSouthNorth'[40] should be supported by such a fund.

Swords into Ploughshares: Redirecting Military Machinery

If renewable energy sustainable development were to replace war in the economic hierarchy, the existing mechanical capabilities facilitating war could be reorientated to serve eco-development needs. Large arms production plants could be refitted for production of technology for sustainable development. Instead of rifles, bombs, tanks and guns, small arms industries could be reorientated for manufacture of ploughs, hand tools, new types of tools for agriculture, food and water preservation and storage[41].

This could also form a key part of the necessary process of adaptation to already inevitable consequences of climate change to date, by producing equipment for use in eco-development projects such as tapping and storing underground water or safe desalination systems. Plants currently dedicated to building vehicles for military purposes would be easily reorientated to building vehicles specifically tailored for delivery of food and water, personnel, medical supplies and emergency teams for aid in natural disasters and intervention in conflict situations.

Redirecting Military Forces

The role of armed forces has been evolving in recent years and non-belligerent-only mandates already exist in some countries. UN peacekeepers are often active in a preventive capacity before a conflict erupts, for post-conflict reconstruction[42], and given diverse training to allow them to play a role in socio-economic development. According to the UN, in 2008 there were 16 peacekeeping operations involving about 111,828 personnel at an estimated cost of 6.8 billion USD – about 5% of global military spending.

An internationally co-ordinated shift in training focus of all national contingents could be made, prioritising skills for deployment in peacekeeping, climate change adaptation projects and aid in natural disasters. The individual personal fulfilment of a more constructive role may ease re-integration of individual soldiers into civilian society with resounding effects for general social cohesion.

In a unique initiative, the Jordanian army has been utilising its facilities to train unemployed youth in various productive skills for work. Several thousand young people have thus acquired employment. Similar actions can be taken by other national armed forces to help in national development in various fields.

Down sizing the industry of war may release some of the 23.9 million people currently engaged in military work[43] for other occupations. This work force could shift to the eco-development industry which is already complaining of shortages[44]. Similarly, the employment opportunities currently arising from post-war rebuilding contracts would easily be replaced in projects reorientating society to sustainable and to better harnessing local resources.

Peaceful Conflict Prevention and Resolution Initiatives

Such a massive reorientation must be underpinned by a powerful movement in conflict prevention

diplomacy. The notion of peaceful conflict resolution is most powerfully embodied by the United Nations. Formed in 1945, this global institution was determined to "unite our strength to maintain international peace and security"[45]. The UN has since developed mechanisms for refocusing international relations towards conflict prevention and peace building through various peaceful means as detailed in Chapter VI[46] of the Charter of the United Nations: *enquiry, mediation, negotiation, arbitration, conciliation and judicial settlement etc.*

In the 1950's, Dag Hammarskjold developed preventive diplomacy which he used with courage and skill as did Secretary Generals. In the 1990's the UN Secretary General Boutros Ghali, introduced the *Agenda for Peace* highlighting preventive diplomacy and deployment, peacemaking and peacekeeping and the ex-Director General of the UN Educational, Scientific and Cultural Organisation (UNESCO), Federico Mayor, launched the *Culture of Peace* project calling on the nations of the world and the civil society to change from a culture of war to a culture of peace[47]. In 2001 Kofi Annan launched a series of conflict prevention initiatives in co-operation with the Security Council and in his report of July 2006 he discussed expanding the offices of the UN Secretariat in preventive action. Ban Ki Moon has followed up on his predecessors initiatives and the Department of Political Affairs has expanded its preventive diplomacy policies.

Some regional organisations have a special unit on the subject, such as the European Union whose unit cooperates on regional workshops[48]. The Organisation of American States and the African Union also have active regional structures on conflict prevention and governments often use these policies with varying results.

Economic and Environmental Incentives

Chapter VII of the UN Charter foreshadows alternative measures to coerce compliance with a peaceful solution such as interruption of economic relations, communication or diplomatic relations[49]. Economic sanctions were taken against South Africa for its apartheid policy, against Iraq for invading Kuwait and against Iran regarding development of its nuclear policy. Because of the extreme suffering of the Iraqi population which resulted[50], the Security Council established norms for the invoking of sanctions to avoid harming the population. Nevertheless, adherence to these norms is infrequent.

In the context of encouraging peace as a means to climate change, practical incentives based on a specific country's real needs are a more constructive deterant to aggression. For example, most of the countries in the Middle East, particularly Lebanon, Palestine, Syria and Jordan, with extremely limited fresh water reserves require technical and financial assistance with desalination technology[51] in order to make sea water usable for agriculture, drinking and general hygiene. Arrangements could be offered to Syria for access to desalinated water as part of a negotiated position regarding the region. Israel could be included in a regional water development scheme in return for implementation of a just withdrawal from Palestine and other occupied territories.

Somalia, in conflict for over four years and in the grips of flood and drought cycles, has underground water that needs technology to develop and such assistance could be part of a negotiated peace package. A similar strategy could encourage cessation of hostilities in Sudan. In pursuing such strategies dangerous conflicts of interest in international forums such as the Security Council must be avoided[52].

International Co-operation and Instruments

The first significant effort in international cooperation on environmental issues was the United Nations Conference on the Human Environment in 1972 where, "having considered the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment", state parties established the Stockholm Declaration as a basis for concerted international action.

The subsequent United Nations Framework Convention on Climate Change (UNFCCC)[53] did not engender any binding commitments and the targets set by its Kyoto Protocol (1997) have also demonstrated shortcomings. Because states favour minimum commitments, and countries such as the US are continually reluctant to sign and ratify, the various existing international instruments are often of limited practical effect. After the UN General Assembly (UNGA) in 2007 the UNGA President underlined the the need reform, stating, "there is overall agreement that we could make faster progress on all environmental goals if our multilateral institutions better reflected contemporary realities"[54].

A new international agreement on climate change is needed to establish a framework of consistent long term policies with effective implementation and enforcement mechanisms. An important opportunity to revise international strategy and create such an agreement was available at the recent meeting of the parties to the UNFCCC at Poznan, and at Copenhagen in 2009. The international community is now well positioned to step-up environmental commitments, with ideological commitment to environmental sustainability enshrined in the *Millenium Development Goals*[55], and a host of governmental and non-governmental[56] bodies working

towards similar targets.

PART V: RECOMMENDED ORGANISATIONAL STEPS

The challenge of ending energy poverty and establishing an economic structure which is financially, socially and environmentally profitable for all is clearly an achievable reality. It requires renewed strength in global governance, which could begin with the following steps:

International Level

- UN Leadership: The UN Secretary General should prioritise the interrelated issues of climate change, sustainable development, energy and conflict prevention throughout the UN system. An inter-agency coordinating body should be considered along with expansion of UNEP.

- UN Decision Making: In view of the disproprtionate voting power of vested interests in existing forums, a seperate platform for discussion and action on these issues is needed. It should plan and implement an economically profitable transition for arms industries and armed forces to pacific projects in eco-development. Participation in this forum should be broad, including representatives from arms industries and heads of national armed forces, representatives of socially-concerned groups, extending even to the possible inclusion of representatives from extremist political groups[57].

- Establish a "Conversion Fund": A multibillion dollar international fund should be created using funds redirected from military expenditures and the arms industries. Carbon taxation should be imposed and added to the fund along with voluntary contributions from donor countries and corporations. This fund should be used to develop renewable energy technology, transform the non-renewables and arms sectors and to sponsor peacebuilding and conflict prevention initiatives. It should also fund initiatives to address mitigation of and adaptation to existing climate change effects.

- Improved International Instruments: Multiple environmental agreements require improved enforcement mechanisms, incorporating accountability and implementation. An international entity should be created to comprehensively oversee these operations.

- A New International Instrument: A new international agreement must establish a framework of consistent long term policies to support the integration of renewable energy technologies into the market. It should combinine incentives for research, development and deployment, and rationalise economic values by pricing GHG emmsisions and other externalities. It must create binding obligations.

- Address Environmentally Induced Migration: An international agreement on environmentally induced migrants, defining their right to refuge and the obligations of states to harbour receive them, should be entered into. This should initiate projects to prepare and assist communities threatened by environmentally induced migration. These communities should be consulted and given options such as resettling in a location of their choice or immigration to host countries. A committee should be set for implementation.

Regional Level

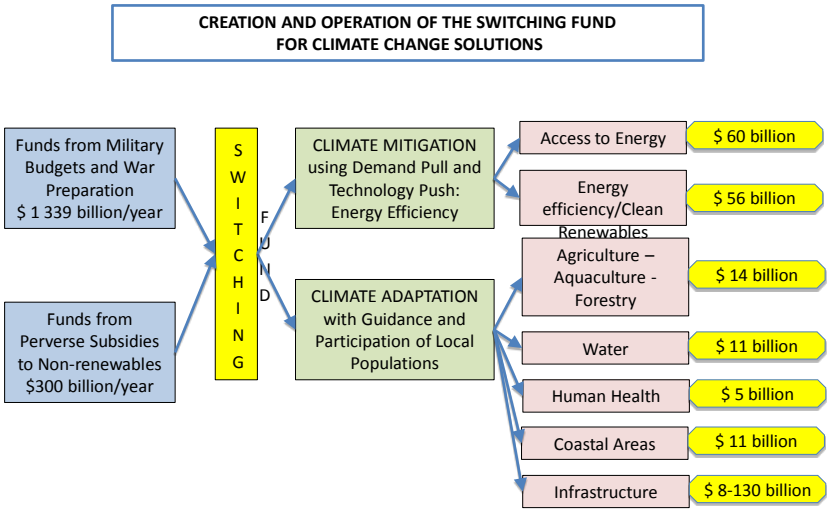
- Regional organisations such as the European Union, African Union, Arab League, Asean, the Organisation of American States, and OECD should cooperate with the global instruments as well as implement their own regional policies.

National Level

- National governments should create an inter-ministerial task force to develop co-ordinated national policies and legislative branches should enact binding laws on the subject coordinated by the International Parliamentary Union.

- The Civil Society and Non-Governmental bodies should be included in national policies and their experience utilised. The communications media has an active role to play and should be part of national and local planning[58].

Figure 1: Creation and operation of the Conversion Fund for Climate Change Solutions



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[1] SIPRI (Stockholm International Peace Research Institute) (2008), *SIPRI Yearbook 2008*, Oxford University Press, England.

[2] IPCC (International Panel on Climate Change) (2007), *Climate Change 2007: Synthesis Report. Contribution of Working Groups I,II and III to the Fourth Assesment Report of the Intergovernmental Panel on Climate Change,* IPCC, Geneva.

[3] Stern, Lord N., (2006), *Stern Review on the Economics of Climate Change*, Cambridge University Press, England.

[4] International Energy Organisation (IEA) (2008), *Key World Energy Statistics 2008*, OECD/IEA, Paris. p.48

[5] IEA (2008), *Key World Energy Statistics 2008*, OECD/IEA, Paris. p.44

[6] Cob, C. and Cob, J. (eds.) (1994) *The Green National Product,* University Press of America, Lanham.
The standard National Accounting Theory, developed in 1956, uses an equation based on consumption plus investment plus exports and does not take into account resource depletion, environmental damage, defensive expenditures or damage to human well-being. As a result various neo-classical theories of Green National Accounting have developed such as the UN System for Economic and Environmental Accounting (SEEA), which includes environmental figures as satellite accounts which can be used to adjust final SNA figures, and more recently the GREENSENSE Index of Consumption Corrected for Environmental Damage (ICCED).

[7] In October 2007, with oil prices in the United States over $90 per barrel, *the Energy Watch Group* released a report claiming that oil production peaked in 2006 and will decline by several percent annually. The authors predict negative economic effects and social unrest as a result.

[8] IEA (2008), *World Energy Outlook*, OECD/ IEA, Paris.

[9] This is particularly so in Africa where already severely limited water supply is predicted to drop a further 10 - 30% by 2050.

[10] See: www.neweconomics.com for the "Green New Deal" currently under discussion in economic circles.

[11] Hansen, J. *Target atmospheric CO2: Where should humanity aim?* This article claims that 2°C is in fact too low and "a receipe for disaster".

[12] Hansen, J. *Target atmospheric CO2: Where should humanity aim?* However the IPCC puts predictions of 21st century sea level rise at a more modest 9 to 88 cm. Over the 20th century sea levels rose between 10 and 20 cms.

[13] Home to more than 11,000 people, Tuvalu is an independent constitutional monarchy in the southwest Pacific Ocean, an archipelgo nation made up of 9 atolls. With its highest point only 5 metres above sea level Tuvalu is one of the most vulnerable nations on earth to sea level rise along with the Maldives and many other island nations.

[14] Guterres, A., UN High Commissionner for Refugees, quoted by Bolopion, P. "Pour le Haut-Commissaire aux Réfugiés de l'ONU, "ce siècle sera celui des peuples en mouvement" *Le Monde*, 29/11/2008, p.4.

[15] The Dutch expect to invest an extra $10 billion to $25 billion in flood and sea defenses over the next century, and are already drafting plans to upgrade dikes, pumping stations, and seawalls

[16] Boncour, P., International Organisation for Migration, quoted in "Réfugiés Climatiques, vers un Tsunami ?" *Libération*, 20&21/11/2008.

[17] No offical term has yet been agreed by the international community to describe such people, but this is currently the most accurate and uncontentious term. The term 'refugee' may be inappropraite in light of its already established specific definition in terms of the United Nations' 1951 Convention and 1967 Protocol on Refugee Status. The word 'migrant' traditionally connotes a choice made on the basis of pull factors of the destination rather than push of the orgin and thus is not enough. Addition of the word 'induced' here is inteded to address this, however the issue of people who are simply displaced *within* their country is not incorporated in this term. Thus, arguably, 'environmentally displaced persons' may ultimately be a more acceptable term. Further debate is needed to resolve this question.

[18] According to the UN-Habitat Programme, cities already consume 75% of the world's energy and GHGs.

[19] This concept is expanded in the 'CUBE' project underway through HELIO International according to examples of inclusive energy governance seen in Canada and Denmark. See: www.helio-international.org for more information.
[20] Guterres, A., UN High Commissioner for Refugees, quoted by Bolopion, P. "Pour le Haut-Commissaire aux Réfugiés de l'ONU, 'ce siècle sera celui des peuples en mouvement'" *Le Monde,* 29/11/2008, p.4.
[21] Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ) (2008), *Climate Change and Security : Challenges for German Development Cooperation,* Schloemer Gruppe, Eschborn.
[22] SIPRI (2008), *SIPRI Yearbook 2008*, Oxford University Press, England.
[23] The fact that these nations are all permenant members of the Security Council reinforces their orchestrative role.
[24] SIPRI (2008), *SIPRI Yearbook 2008*, Oxford University Press, England.
[25] Tricastin, France 2008, Chernobyl disaster, info re perpetual 30km Zone of Alienation.
[26] There are still 9 states with nucelar reactors who have not ratified the Nuclear Non-proliferation Treaty. Those are China, Eygpt, India, Indonesia, Iran, Israel, North Korea, Pakistan and the United States.
[27] Chakraborty & Govind, S. (2008) "Should Energy be Subsidised ?", *ICFAI Journal of Environmental Economics*, February, pp. 55-69. Note also that a 1992 World Bank study estimated the global annual fossil fuels consumption subsidies at US$230 billion.
[28] IEA (2008), *World Energy Outlook,* OECD/ IEA, Paris.
[29] IEA (2008), *World Energy Outlook,* OECD/ IEA, Paris.
[30] IEA (2008), *Key World Energy Statistics 2008*, OECD/IEA, Paris. p9
[31] See: D. Nocera's 2008 breakthrough paper from Massachusetts Institute of Technology.
[32] Renewable Energy Sources Act entered into force 01/08/2004:
Purpose:
(1) The purpose of this act is to facilitate a sustainable development of energy supply, particularly for the sake of protecting our climate, nature and the environment, to reduce the costs of energy supply to the national economy, also by incorporating long-term external effects, to protect nature and the environment, to contribute to avoiding conflicts over fossil fuels and to promote the further development of technologies for the generation of electricity from renewable energy sources.
(2) This act is further intended to contribute to the increase in the percentage of renewable energy sources in power supply to at least 12.5 per cent by 2010 and to at least 20 per cent by 2020.
[33] IEA (2008), *Deploying Renewables: Principles for Effective Policies,* OECD/ IEA, Paris..
[34] Attali, J. "Le Tsunami Climatique", *L'Express* 9/10/2008, p.50.
[35] http://www.globalreporting.org/NewsEventsPress/LatestNews/2008/NewsOctober08EditorsLetter.htm
[36] http://www.responsible-investor.com/home/article/un_launches_green_new_deal_for_sustainable_investment/P1/
[37] Attempted by the Post Carbon Institute (http://www.postcarbon.org/100-percent-renewable) who devised ten-step plan to implement Al Gore's challenge for the US to produce 100% of its electrical needs from renewable sources.
[38] IEA (2008), *World Energy Outlook,* OECD/ IEA, Paris.
[39] United Nations Development Programme (2007), *Human Development Report*, p. 17
[40] This project uses solar technology in irrigation and water pumping to help local small farmers cope with drying effects of climate change. For more information see: http://www.southsouthnorth.org/
[41] See: http://www.ploughshares.ca for examples of initiatives already launched.
[42] In Lebanon UN forces helped de-mine cluster bombs and were active in community rehabilitation.
[43] According to statistics provided by Project Ploughshares 2008 report 23.9 million people worldwide are engaged as military personnel in 2008.
[44] International Labour Organisation (2008), *For Honest Work in Sustainable, Low Carbon World.*
[45] Excerpt from the preamble to the Charter of the United Nations.
[46] Specifically Chapter VI of the Charter of the United Nations calls on "The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall first of all, seek a solution by negotiation, enquiry, mediation conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements or other peaceful means of their own choice."
[47] The programme was adopted by the UN General Assembly which called for a decade on the subject.
[48] In April 2008 one such workshop was held on Conflict Prevention and Climate Change and in October 2008 a workshop was held on Conflict Prevention and Illicit Trafikking of Arms.
[49] Article 41, The Charter of the United Nations.
[50] UNICEF has stated that 50,000 Iraqi children died as a result of these sanctions.
[51] Only sustainable desalination methods where salt product is recycled must be promoted.
[52] Initiatives for peace in Darfur have been blocked in the UN Security Council by states such as Russia and China.
[53] The United Nations Earth Summit took place in Rio De Janiero in 1992.
[54] UN News Centre Report, (3/10/2007), "UN Assembly Wraps up Annual high-level debate with calls for action – President".
[55] The 7th of the 9 'Millenium Development Goals' is to ensure environmental sustainability. At the last UN Assembly in September 2008 $16 billion was allocated to support the Millenium Development Goals.
[56] The role of the numerous active Non-Governmental Organisations such as the Climate Action Network (CAN) will continue to be essential in urging poltical leaders to take action and in mobilising communities to take an active part in pursuing supporting environmental goals.
[57] If an issue is blocked in the Security Council it can be taken to the General Assembly. Such action has been taken numerous times on controversial UN issues, particularly in the Middle East, (Suez Crisis in 1956).
[58] The existing UNESCO Power of Peace project works on how mass media and communication tools can contribute to cultural self-expression and peace and this initiative should be extended to the environmental aspects also. See: www.unesco.org/webworld/powerofpeace