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Creating Economic Stimulus while Stopping Climate Credit Risk/Irreversibility

- Executive Summary
- Needed Near Term Pollution Reductions to Stop DAI (Dangerous Anthropogenic* Interference) with Climate/Irreversibility

*Man-made

February 2008

Completed First Peer Review February 20, 2008
Completed Final Peer Review on March 21, 2008

The Partnership appreciates the leadership assistance provided for this Report by Guido Franco, California Climate Change Center Program Director, California Energy Commission, Cliff Rechtschaffen, JD, Climate Change Advisor to Jerry Brown, California Attorney General, and Steve Schneider, Ph.D, Stanford University and IPCC.

Acting Now to Secure a Healthy & Prosperous Tomorrow

Executive Summary

International treaty of 1992 of the world's governments requires that Dangerous Climate Change be stopped now.

NASA and other leading scientists' findings of November and December 2007 show that we exceeded the safe limit of climate pollution and are currently at a Dangerous level in violation of US and international law, placing human health and environment at an unreasonable risk.

The Intergovernmental Panel on Climate Change (IPCC) is comprised of the world's governments and leading climate scientists who were awarded the Nobel Peace Prize. IPCC concludes that at today's Dangerous level, the world is subject to serious and / or irreversible impacts to:

- food supply
- infrastructure
- health
- water resources
- coastal systems including rising sea level
- ecosystems with high confidence of extinction of many species and reduction in ecosystem diversity
- global biogeochemical cycles with increasing ocean acidity adversely impacting organisms including corals
- ice sheets with partial or near-total irreversible deglaciation of Greenland and West Antarctica
- modes of oceanic and atmospheric circulation
- migration
- conflict
- aggregate market impacts and distribution

IPCC and leading scientists believe that climate pollution growth must be stopped in the next 10 years or else Dangerous Climate Change may likely go Irreversible causing the unacceptable risks enumerated above. Such action will also provide an economic stimulus.

Accordingly, there is a consensus on the need to make substantial near term pollution reductions to stop pollution growth and start a decline in the overall pollution level, by leading climate scientists, governments, global security experts and the insurance and real estate finance industries. Insurance and real estate finance show substantial added costs from climate damages to their safe operations, which Moody's calls a "serious credit risk."

A task force of leading global security experts concludes that runaway climate change "would destabilize virtually every aspect of modern life." The UK's *Stern Review* (2007) concludes that runaway Dangerous Climate Change may wipe out 20% of global GDP.

Moreover, climate pollution is accelerating beyond even the worst case IPCC pollution projections.

Based on successful precedent and quantified benefits, Sustainable Building Investment Underwriting Standards and Sustainable Mortgage Backed Securities (SMBS) can reduce the needed amount of climate pollution over the next 10 years to prevent Dangerous Climate Change from going Irreversible. SMBS are bonds backed by 100% green buildings with sustainable products.

Green buildings are energy and environmentally efficient and more valuable than conventional buildings based on completed due diligence conducted with Wall Street's leading investment banks and rating agencies. Sustainable products are best for the environment, economy and social equity.

Certified climate neutral buildings reduce climate pollution by 100%, certified sustainable products reduce it by 40% over the global supply chain, and certified green buildings reduce it by 35%. At expected near term green building market penetration, Sustainable Investment Underwriting Standards and SMBS will:

- Add about $1 trillion/ yr. to the economy
- Provide an additional economic stimulus through higher valued collateral and innovative new products improving investor confidence
- Promote energy and global security
- Stop Imminent Irreversible Dangerous Climate Change
- Substantially increase investment bank and rating agency profits through fees in resecuritizing the building stock

Based on IPCC projections of pollution growth adjusted for validated accelerated growth, about 2.8M certified green and climate neutral buildings and 1.2M certified sustainable products are needed for 2008-2015 to stop Imminent Irreversible Dangerous Climate Change.

The Capital Markets Partnership, including the world's leading investment banks, adopted consensus standards as part of its due diligence covering these certified green buildings and sustainable products (*Standards Requirements 2.0* 2006).

The Standards and Schedule of needed green buildings and sustainable products provide for increased traction in the next few years, with a larger scale 25%/yr. of needed buildings and products certified from 2013-2015.

The number of needed buildings and products is conservative incorporating an added 60% margin of safety allowing for uncertainties and accelerated pollution growth. The Capital Markets Partnership (CMP) will measure and report progress and initiate any needed mid-course corrections.

It's important to recognize that there are no enacted federal or state requirements for needed climate pollution reductions over the next 10 years to stop Irreversibility. Thus, Investment Underwriting Standards and SMBS are singularly important and CMP Members have responded by launching $70B in 2007 Climate Pollution reduction initiatives in fulfilling their legal responsibility to accurately reflect climate risk.

Near Term Needed Pollution Reductions to Stop Dangerous Anthropogenic Interference (DAI) With Climate / Irreversibility

Contents Page

Needed Near Term Pollution Reductions to Stop Dangerous Anthropogenic Interference (DAI) with Climate / Irreversibility

1. Intergovernmental Panel on Climate Change (IPCC) Background on DAI & Irreversibility

IPCC conclusions are important since its 2007 Fourth Assessment Report is the latest consensus climate change position of the world's governments resulting in IPCC as a recipient of the Nobel Peace Prize.

IPCC relies on the binding international covenant to avoid Dangerous Anthropogenic Interference (DAI) by the 1992 UN Framework Convention / Treaty on Climate Change. Anthropogenic means man made.

IPCC's Fourth Assessment Report identifies as guidance for decision makers on DAI, key vulnerabilities including magnitude, timing, persistence and irreversibility of impacts (Schneider et al. IPCC Climate Change 2007 Fourth Assessment Report, Chptr. 19, Cambridge U. Press, at 781-2).

These vulnerabilities identify where people and systems can be adversely affected by serious impacts and / or irreversible consequences to (*Id*. at 782-3, 787, 792-3):

- food supply
- infrastructure
- health
- water resources
- coastal systems including rising sea level
- ecosystems (high confidence of extinction of many species and reduction in ecosystem diversity)
- global biogeochemical cycles (increasing ocean acidity adversely impacting organisms including corals)
- ice sheets (partial or near-total irreversible deglaciation of Greenland and West Antarctica)
- modes of oceanic and atmospheric circulation
- migration
- conflict
- aggregate market impacts and distribution

This 1992 Climate Change Treaty Article 2 states the need to achieve:

"stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such

level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

It is appropriate that Wall Street policy decisions be based on this Treaty's consensus position of the world's governments which "*commits governments to avoiding 'dangerous anthropogenic interference with the climate system'* " (Yohe et al. IPCC Climate Change 2007 Fourth Assessment Report, Chptr. 20, Cambridge U. Press, at 837).

Without the cessation of emissions growth, IPCC and other leading scientists' conclude serious irreversible impacts may likely be "triggered" in the near term (10 yrs.) (*Id.* at 782 and Hansen et al., Dangerous Human-made Interference with Climate: A GISS modelE study, *Atmos. Chem. Phys.*, *7*, 2287-2312) (collaboration of leading US & French climate scientists). As the tipping points pass, *"there is an acceleration, potentially uncontrollable, of emissions of vast natural stores of greenhouse gas*," according to Hansen (*NASA: Danger Point Closer Than Thought From Warming*, ABC News, May. 29, 2007). Even *"moderate additional"* greenhouse emissions are likely to push Earth past *"critical tipping points"* with *"dangerous consequences for the planet" (Id.).*

IPCC concludes that certain impacts are irreversible and persistent (Schneider et al. 2007 at 785-6):

- Irreversible impacts include changes in regional or global biogeochemical cycles and land cover, loss of major ice sheets, shutdown of the meridional ocean overturning circulation, extinction of species, and loss of unique cultures.
- Persistent impacts include near permanent droughts, intensified cycles of extreme flooding

It is also appropriate that Irreversibility be used as a risk management / Policy issue given the seriousness, magnitude and imminence of the risk.

2. Scientific, Insurance & Real Estate Finance Industries Conclusions Supporting Immediate Substantial Climate Pollution Reductions

IPCC concludes that:

- Man made climate change has caused *"increases in human mortality, loss of glaciers, and increas*es in the frequency and/or intensity of extreme events" (Schneider et al. IPCC 2007 Fourth Assessment Report at 781).
- "*Actions to mitigate climate change reduce the risk … . Postponement of such actions … increases risks. … The probability of initiating some large scale events* [record droughts, heat waves, floods, storms, fires] *is very likely to continue to increase as long as greenhouse gas concentrations and temperature continue to increase"* (*Id*. at 782).

- "*Recent extreme climatic events have demonstrated that such events can cause significant loss of life and property damage in both developed and undeveloped countries*" (Id. at 796).
- "[C]*limate change could adversely affect hundreds of millions of people through increased risk of coastal flooding, reduction in water supplies, increased risk of malnutrition and increased risk of exposure to disease. … The Global Burden of Disease study estimated that the climate change that has occurred since 1990 has increased mortality, and that projected climate change will increase future disease burdens even with adaptation" (Id. at 796).*
- *"*[M]*itigation activities involving near-term emissions reductions will have a significant effect on* [CO2]*concentration and temperature profiles over the next century"* (*Id*. at 804).

Another key consideration affecting climate damages is that current estimates are understated: [G]*lobally aggregated figures from integrated assessment models underestimate climate costs because they do not include significant impacts that have not yet been monetized"* (IPPC, Yohe et al., Fourth Assessment Report 2007, Chptr. 20 at 813).

Leading Scientists' Conclusions. The magnitude of man's effect on climate is underscored by the fact that *"warmth of the last half century is unusual in at least the previous 1,300 years"* (Aspenia Questions to Stephen H. Schneider, Ph.D, at 1, 2007), and *"[c]urrent levels of greenhouse gases are higher now than at any time in at least the past 650,000 years"* (Sir Nicholas Stern, author, UK's Review on the Economics on Climate Change, British Embassy, Sept. 27, 2007).

Further, current knowledge shows that [Irreversible] Dangerous Climate Change can only be reliably prevented by the most stringent climate pollution reductions (Yohe et al. at 827). Schneider echoes this view: *"To avoid warming beyond a few degrees associated with wide-spread negatives impacts and unacceptable risks, major mitigation policies that reduce emissions are necessary. … Policies need to focus on incentives to promote such* [energy efficiency, green power] *investments"* (Schneider, Aspenia Questions 2007 at 6).

Recent testimony underscores Wall Street's need to act now. Stephen Schneider, Ph.D., of Stanford University testified to the House Ways & Means Committee (Feb. 28, 2007 at 2):

> *"Continuation of 'business as usual' raises a serious concern from the risk management point of view. … Few security agencies, businesses or health establishments would accept such high odds of potentially dangerous outcomes without implementing hedging strategies to protect themselves, societies and Nature fro the risks – of climate change. … This is just a planetary scale extension to the risk-averse principles that lead to investments in insurance,* [military] *deterrence, precautionary health services and business strategies to minimize downside risks of uncertainty."*

James Hansen, Ph. D, testified to the House Select Committee on Energy Independence & Global Warming (Apr. 26, 2007 at 3):

> *"Crystallizing scientific data and analysis reveal that the Earth is close to dangerous climate change, to tipping points of the system with the potential for irreversible deleterious effects. The information derives in part from*

paleoclimate data, the record of how climate changed in the past, as well as from measurements being made now by satellites and in the field."

Hansen relies on actual data, not models, and concludes (*Id*.) that very little additional climate pollution will cause:

- An intensification of subtropical conditions greatly exacerbating water shortages in the American West and many other parts of the world
- Likely semi-arid states from west and central Texas through Oklahoma, Kansas, Nebraska and the Dakotas increasingly drought prone and unsuitable for agriculture.
- Extermination of a large fraction of plant and animal species
- Loss of all summer Arctic ice with devastating effects on wildlife and indigenous people

Hansen is recognized by the President of the National Academies of Science as the top one or two climate scientists in the world (60 Minutes Mar. & July 2006). He concluded that we have to make substantial reductions in the next 10 years to stop DAI / Irreversibility (Der Spiegel Interview, "*We Need to Take Action Soon*," Apr. 10, 2007).

On 60 Minutes, March & July 30 2006, Hansen emphasized:

"*We have to, in the next 10 years, get off this exponential curve and begin to decrease the rate of growth of CO_2 emissions. And then flatten it out. And before we get to the middle of the century, we've got to be on a declining curve*."

"If that doesn't happen in 10 years, then I don't think we can keep global warming under one degree Celsius and that means we're going to, that there's a great danger of passing some of these tipping points. If the ice sheets begin to disintegrate, what can you do about it? You can't tie a rope around the ice sheet. You can't build a wall around the ice sheets. It will be a situation that is out of our control."

Insurance & Real Estate Finance. Reinsurers Chief Risk Officers' (CRO) Report concludes that continued damages from climate change will likely cause the end of private insurance: "*the sheer magnitude of climate change could in future impact a large number of industries to such an extent that sustainable insurability may ultimately be put into question*" (CRO Briefing Position Paper - Climate Change & Tropical Cyclones in the North Atlantic, Caribbean and Gulf of Mexico at 10 (2006). Total economic losses during 2004-5 from storms alone were $130B USD (*Id*.).

Lloyds 360 Risk Project Report (2006) urges immediate action - "*or the changing climate could kill us. ... reduction of CO2 emissions is crucial*" (at 4).

Insurance is 10% of the economy and affects all of it (National Association of Insurance Commissioners 2006). CERES 2005 Report, Availability and Affordability of Insurance Under Climate Change, *A Growing Challenge for the U.S.* (E. Mills, R. Roth, Jr., E. Lecomte) concludes that the insurance industry is being substantially damaged by climate change, causing insurer withdrawal of coverage forcing taxpayers to pick up the financial burden:

"Rating agencies are putting large insurers such as Allstate and State Farm on

notice for possible ratings downgrades" (at 6).

"Insured U.S. weather-related losses are growing 10-times faster than Premiums and the overall economy, and even faster when compared with population: 1971–2004" (at 7).

"In Florida, the wave of hurricanes in 2004 prompted substantial rate increases, despite which seven private insurers stopped writing homeowners policies in the state or withdrew from the market altogether" (at 8).

"Meanwhile, government-provided crop and flood insurance programs are experiencing rising losses, wildfire events are causing two times more damage compared to a few decades ago, and coastal erosion insurance is entirely unavailable. The latter issue is an especially acute concern because climate change is expected to cause a twin combination of sea level rise and stronger storm surges, a direct physical threat to many coastal properties in the U.S." (at 8).

*"Globally, economic costs due to natural catastrophes have increased seven-fold in the last 40 years, while insured losses have increased 14-fold," (*British Association of Insurers testimony to *The Stern Review*, citing Annual Review of Natural Catastrophes 2003. Munich Re Topics 2004, at 7). Natural catastrophes could double within a decade (*Id*. at 22).

Withdrawal of coverage is not a complete financial solution for insurers and reinsurers due to potential financial liability from long term liability "tails" in many insurance contracts.

Climate Change also threatens real estate finance which is a $4 trillion industry just for securitization alone, according to the SEC (*Staff Report of the Task Force on Mortgage-Backed Securities Disclosure* (2003)). The Mortgage Bankers Association's Report on Natural Disaster Catastrophic Insurance (2006) highlights adverse impacts from the decline in availability and affordability of insurance from climate damages:

"[R]eports of property insurance rate increases of over 100 percent have been the norm, with some borrowers reporting increases of up to 600 percent. … Borrowers purchasing property … reported that the high catastrophic insurance costs in Florida and the Gulf Coast have caused the delay or cancellation of some deals. Deals have been cancelled either because catastrophic insurance was not available or the pricing of catastrophic insurance lowered the debt service coverage ratios to unacceptable levels (at 39)."

"Given the hard market conditions for catastrophic insurance, lenders are faced with the challenge of meeting insurance underwriting requirements without full replacement cost insurance either unavailable or unaffordable (or both) in some areas" (at 40).

"*Moodys raised the concern that movement away from full replacement cost insurance policies could have "serious" credit implications" (at 42).*

"As indicated by Moodys, loans that are included in a pool without full replacement costs insurance coverage or have "troubling" language, may be required to have increased subordination levels. This could increase the size of the of the B piece tranche in a securitization. At this point, B piece buyers will have to carefully examine the hurricane or other catastrophic risk exposure of the loans without full coverage and factor this into their modeling and decision process for purchasing an interest in a B piece pool" (at 44)

"Insurance Company Rating Agencies' Concerns Shrink Catastrophic Insurance Capacity" (at 45).

"Catastrophic insurance pricing may never return to pre-Katrina levels due to increased loss expectations from hurricanes and rating agency scrutiny over an insurance company's overall exposure to catastrophic events" (Id).

"Available and Affordable Property Insurance is Essential to the Real Estate Finance Industry. Both residential and commercial mortgages require "all risk" insurance coverage to be in place during the life of the mortgage. Consequently, disruptions in the availability or affordability of property insurance seriously undermines the real estate finance industry by shifting catastrophic property damage risk from the insurance industry to the real estate finance industry which has not priced such risk into its product offering" (at 46).

European Union, North America & Global Security. The European Union concurs on the need to act now. Stavros Dimas, EU Commissioner for the Environment said, "*Climate change is one of the gravest threats to our planet. Acting against climate change is imperative*" ("EU Plans Steep Emissions Cuts to Avert Climate Disaster," Environmental News Service, Jan. 10, 2007).

The Commission, Europe's executive branch of government, warned that if left unchecked, global warming is likely to trigger regional conflicts, poverty, famine, disease, and migration (*Id.)*.

Climate change impacts are pervasive and include global security. A task force of experts led by two reputable Security think tanks concludes that runaway climate change "*would destabilise virtually every aspect of modern life*," (Centre for Strategic and International Studies and the Centre for a New American Security, The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change). "*The only comparable experience for many in the group was considering what the aftermath of a U.S.-Soviet nuclear exchange might have entailed during the height of the Cold War*," (World Business Council for Sustainable Development, Nov. 5, 2007).

"*We are standing on the threshold of the largest opportunity in human history to increase significantly [through green buildings] the quality of life for all citizens of North America and the vitality of our social, economic and environmental systems*," (*Green Building in North America,* North American Agreement on Environmental Cooperation, 2008 at 72).

"*North America is facing unprecedented challenges in areas such as climate change, concerns regarding security of energy supplies, and the depletion of water and natural resources.*

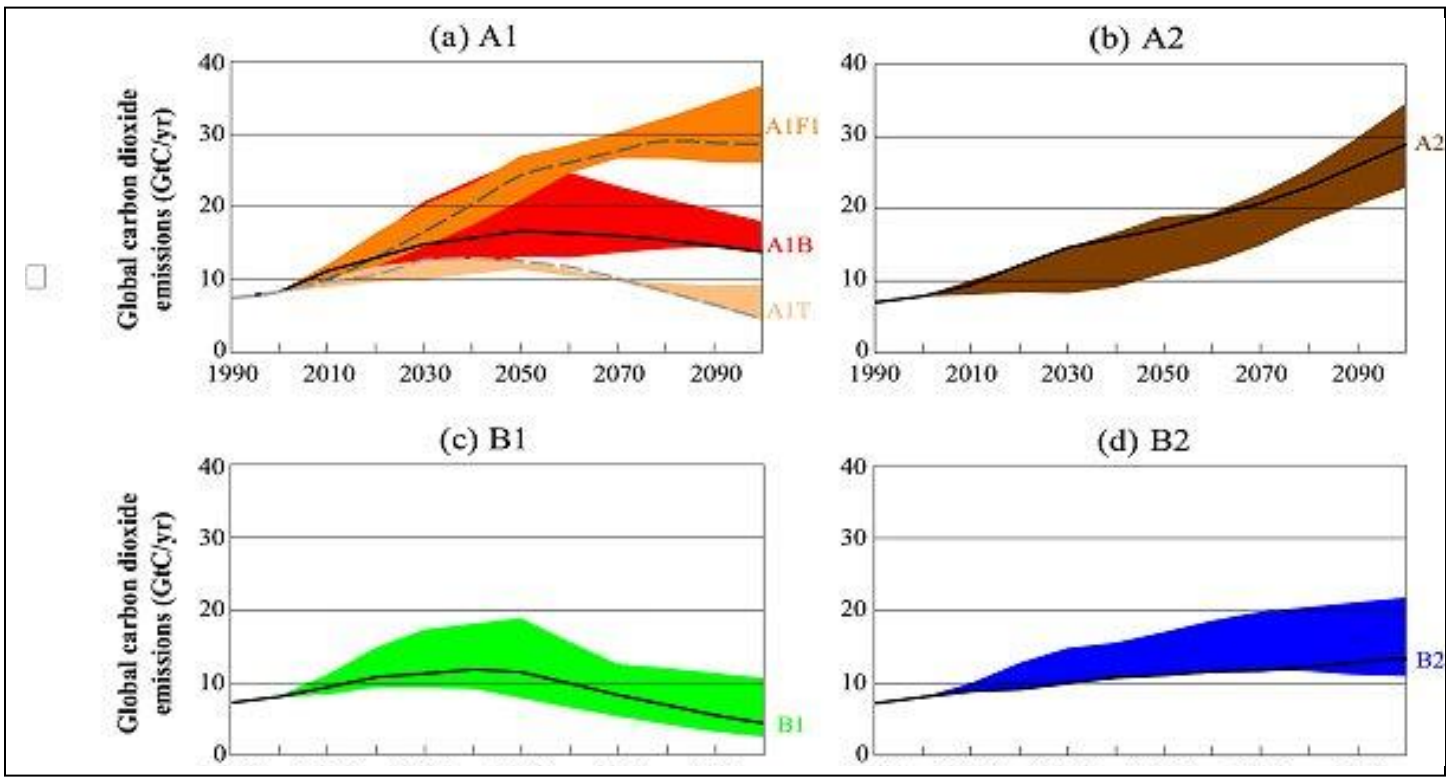
These challenges are not insurmountable. Canada, Mexico and the United States have the resources, wealth and ingenuity to overcome these challenges and create a sustainable, healthier and more productive North America," (Id.).

3. IPCC 2000 Climate Pollution Level Suggested as Baseline for Near Term Reductions to Stop DAI / Irreversibility: 9 gigatons carbon/yr (9 GtC/yr) (IPCC Special Report on Emission Scenarios 2000). A gigaton is one billion tons.

http://www.grida.no/climate/ipcc/emission/005.htm

Figure 1. IPCC 2000 Summary for Policymakers: Figure SPM-3

Total global annual CO_2 emissions from all sources (energy, industry, and land-use change)



Using the fossil-intensive Scenario A1FI above in graph (a) (comprising the high-coal and high-oil-and-gas scenarios) which most accurately represents current and expected future CO2 emissions, the global CO2 levels are:

- 1990: 8 GtC/yr
- 2000: 9 GtC/yr
- 2005: 10 GtC/yr.
- 2010: 11 GtC/yr.
- 2015: 14 GtC/yr.
- 2020: 17 GtC/yr.
- 2030: 21 GtC/yr.

However, due to accelerated growth of CO2 beyond this IPCC worst case scenario above, we need to correct for the higher level 3.3%/yr. growth from 2000 -2006 as shown by Conway et al. measurements in section 4 below. IPCC's worst case scenario was only 2.4% growth, thus there is a 0.9% added growth, and the 2000 baseline number becomes 9.081 GtC/yr. To deal with rising growth beyond 2005, a 6% growth rate is assumed for 2008 to 2015 which seems likely given growing world economies and predominance of conventional energy use. Replacing IPCC's 2.4% growth rate with the 6% rate means an added 3.6% growth from 2008 to 2015.

Accordingly, the revised CO2 emissions adjusted for the documented and expected growth beyond IPCC's worst case scenario are:

- 1990: 8.0 GtC/yr.
- 2000: 9.081 GtC/yr
- 2005: 10.09 GtC/yr.
- 2010: 11.396 GtC/yr.
- 2015: 14.504 GtC/yr.

The emission projections by the US Climate Change Science Program are also below the actual emission growth rate shown by Conway et al. (Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations 2007) (Fig. TS.5: 10 GtC/yr. at 2015 at 14. Fig. TS.10 at 20, Fig. 3.15 at 79, Fig. 3.17 at 81 are all below 10 GtC/yr. at 2015).

4. Extent of Recent Accelerated Climate Pollution Growth With Long Term Implications is at or beyond worse case projections.

Climate pollution now dwarfs worst case projections (Thomas Conway et al., in Proc Natl Acad Sci U S A. 2007 November 20; 104(47): 18866–18870., "*Contributions to Accelerating Atmospheric CO_2 Growth from Economic Activity, Carbon Intensity, and Efficiency of Natural Sinks,"* http://www.denverpost.com/news/ci_7253081). "*Conway and co- authors from around the world show that carbon dioxide emissions increased 3.3% per year from 2000 to 2006, compared with just 1.3% annual growth in the 1990s*."

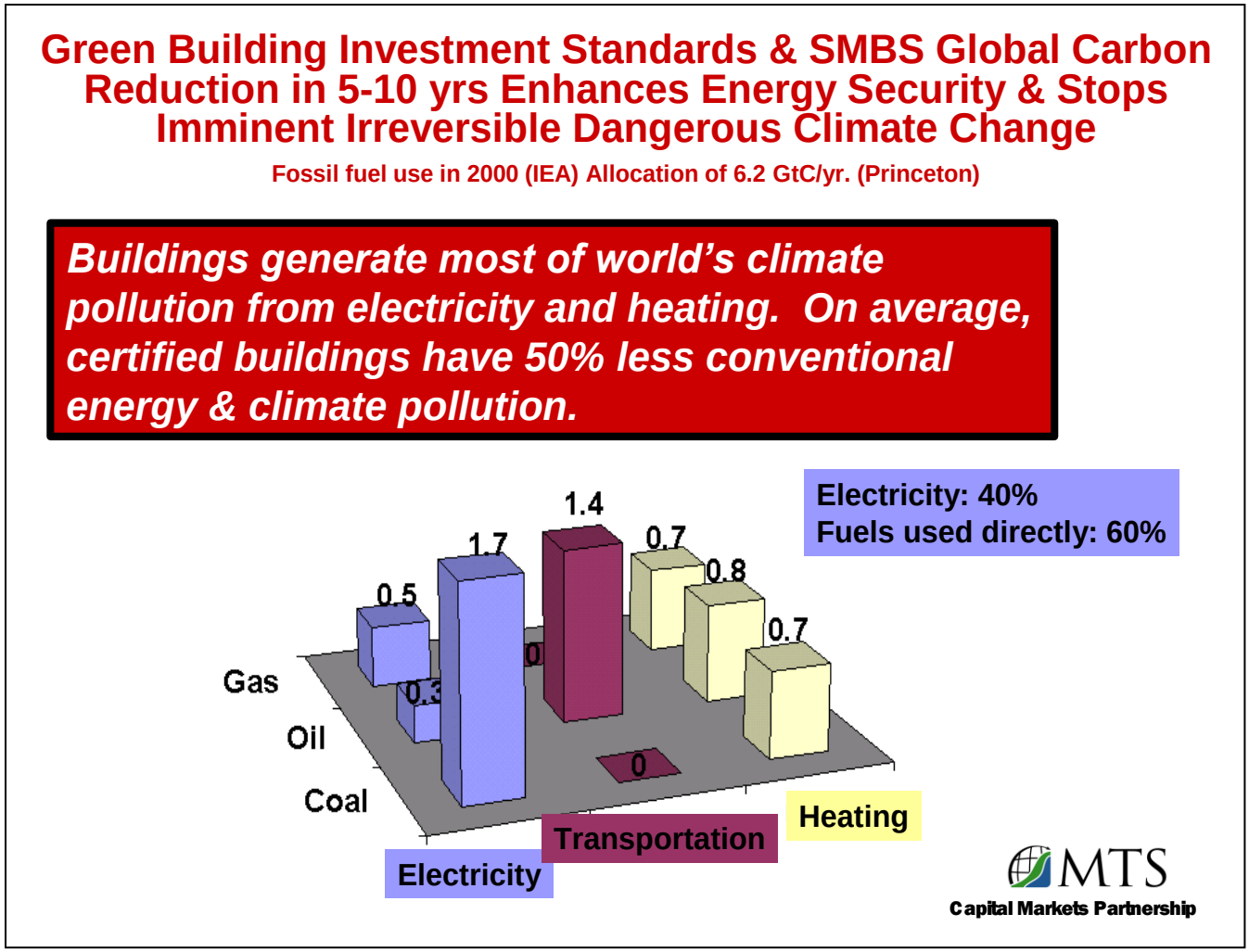
"*The U.N. projected a worst-case emissions growth rate of 2.4 percent, Conway said. … Until recently, much of the excess carbon dioxide humans pumped into the atmosphere, primarily by burning fossil fuels, was sucked back down by growing forests and by the oceans, Conway said. … Now, changes in the oceans - and years of drought around the world - appear to have limited the planet's carbon-absorbing capacity, the new study said*."

"Now humans are applying a much stronger, much faster forcing as we put back into the atmosphere, in a geologic heartbeat, fossil fuels that accumulated over millions of years" (Hansen Testimony 2007).

"The climate system has inertia. Nearly full response to a climate forcing requires decades to centuries. But that inertia is not our friend. It means that there is additional climate change in the pipeline that will occur in coming decades even without additional greenhouse gases" (*Id.*). Thus, climate pollution has a very long life span thus making essential during the next 10 years, large scale pollution reductions reducing total climate pollution growth. Very little additional pollution is needed to cause dramatic adverse effects.

5. Princeton Wedges Breakdown on Pollution Sources including building & products' sectors. Note that IPCC and Conway data above on quantity of emissions are viewed as more accurate than the IEA amount in Figure 2 below, and thus only the breakdown of sources are used for illustrative purposes.

Figure 2. Princeton Wedges Breakdown on Pollution Sources



6. **<u>Consensus on Needed Short Term Pollution Reduction *Guidance* Preventing DAI</u>** / Irreversibility (see 12-15-07 confirmation email to Schneider, Hansen et al.):

> "*We have to, in the next 10 years, get off this exponential curve and begin to decrease the rate of growth of CO_2 emissions. And then flatten it out."* (Hansen 60 Minutes Interview 2006).

Hansen based this conclusion on the need to avoid additional warming causing irreversible tipping points like melting of Greenland and West Antarctic ice sheets (*Id*.) which would cause substantial coastal flooding, property damage and salt water intrusion

contaminating groundwater.

Hansen stated further that without these climate pollution reductions in the next 10 years, it would lock in future catastrophic climatic change and impacts that will unfold during the remainder of this century and beyond. (US House Testimony at 12, Apr.27, 2007).

Schneider and Franco concluded that this Guidance is appropriate (Steven Schneider, PhD., Stanford University & Guido Franco, California Energy Commission, email communications 12-23-07 & 1-3-08 respectively).

7. Mean Measured Climate Pollution Reductions From Green Buildings & Sustainable Products:

- Climate Neutral Buildings - 100% of operations are climate neutral.
- Certified Sustainable Products: 40% of manufacturing & supply chain emissions are reduced at Gold / Platinum levels (MTS 2007).
- LEED green buildings - 35% conventional energy reduction & 17% of certified buildings use green power (USGBC 2005)
- ENERGY STAR buildings - EPA data show a 31% conventional energy reduction for 26 US regions: http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_carbon
- These are consensus technologies -
    - covering the world's largest industry
    - covering world's greatest climate emissions
    - part of Capital Markets Partnership (CMP) *Sustainable Mortgage Backed Securities (SMBS) Standards' Requirements 2.0*

8. How Green Building Investment Underwriting Standards & Sustainable Mortgage Backed Securities (SMBS) Accelerate Green Building & Sustainable Product Certifications & Stimulate the Economy

Green Building Investment Underwriting Standards have been prepared for adoption by investment bank and major realty investors. SMBS are bonds backed by 100% green buildings and certified sustainable products (Investment Standards and SMBS, Capital Markets Partnership (CMP) 2007). MBS are a $4 trillion global industry (SEC 2003). Green buildings and sustainable products are national consensus standards incorporated into *Investment and SMBS Standards Requirements 2.0* (CMP 2007). Consensus standards substantially reduce risk and uncertainty and thus are required by the capital markets for adoption (*Id.*).

Based on quantified benefits and successful precedent, Green Building Investment Underwriting Standards and SMBS are expected to (CMP 2007):

- Stimulate the economy
- Counter the Subprime crisis with valuable collateral
- Improve energy and global security
- Substantially increase investment bank and rating agency profits through fees in resecuritizing the building stock
- Stop Imminent Irreversible Dangerous Climate Change

Similar consensus standards incorporated into MBS are the Phase 1 Environmental Site Assessment and Property Condition Assessment (PCA). Importantly like green buildings and sustainable products, the Phase 1 and PCA substantially added value and reduced risk and thus investment banks and rating agencies qualified buildings with these standards for MBS pools and kept repeating the process driving Phase 1 and PCA market penetration to 95% in 3-5 years (See Fig. 3 below).

Through five years and $500,000, CMP conducted important due diligence with the investment banks and Rating Agencies documenting added value and reduced risk of Green Building Investment Underwriting Standards and SMBS:

- *Green & ENERGY STAR Building Finance Summit* with over $100B in real estate investment represented, concluded that green buildings are more valuable based on debt and equity sessions and case studies.

- Briefed the Rating Agencies before and after the Summit securing their support for Investment Underwriting Standards and SMBS

- Prepared *Green Building Value Rating System*© with investment banks showing with best available data, that green buildings substantially reduce risk and add value.

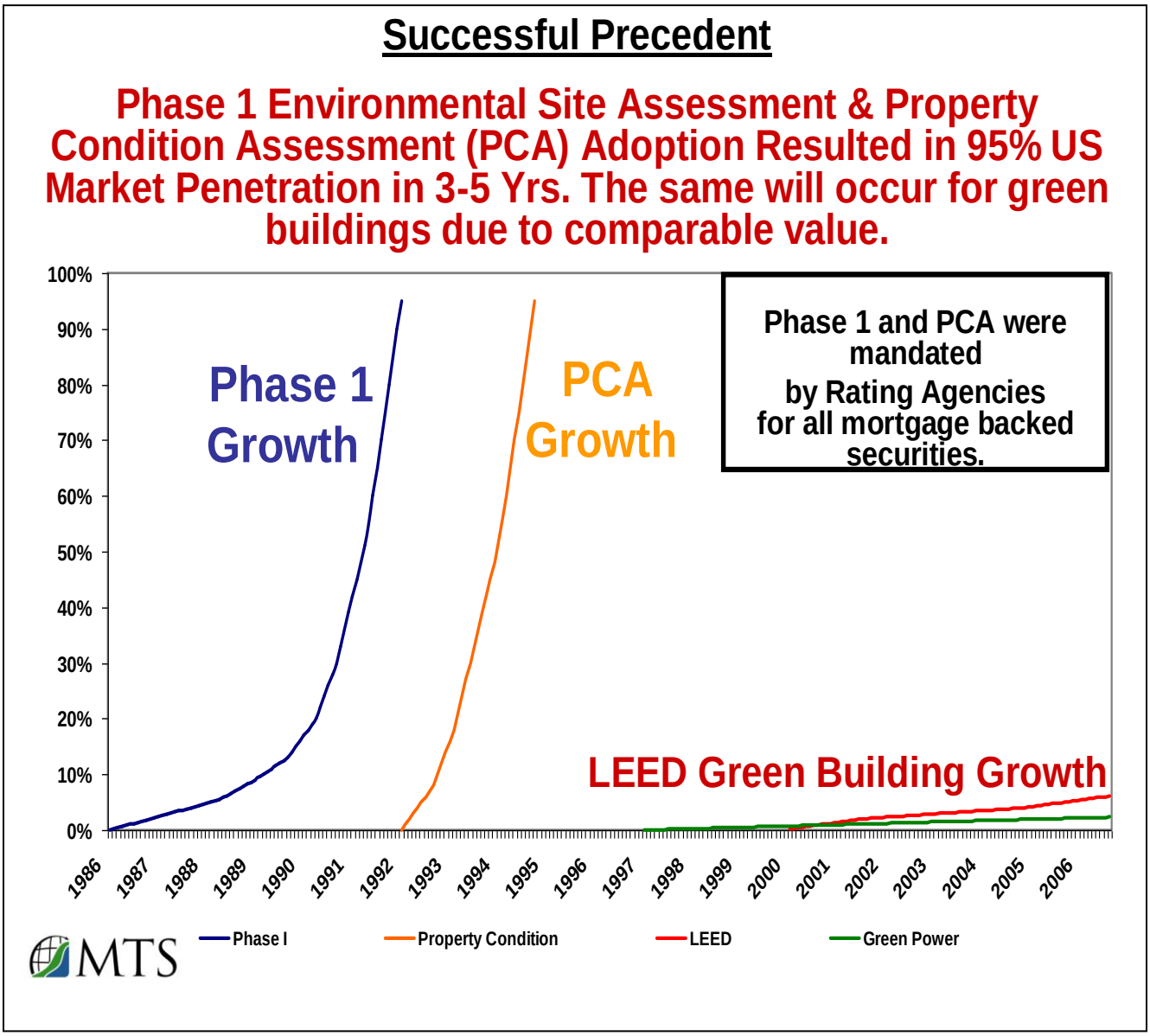
- Citi / CMP Recommendation to Standard & Poors (S&P) to initiate Investment Underwriting Standards and SMBS based on the Value Rating System.

- Completing at the Request of S&P, Investor Surveys showing substantial interest in purchasing green building investment products and SMBS including $2 trillion in social investment with no real estate option.

- Completed *Investment and SMBS Standards Requirements 2.0*© specifying how LEED, ENERGY STAR, and Climate Neutral Certified Buildings can be used for investment purposes and aggregated into MBS Pools now with sufficient buildings to meet diversification and quantity needs for MBS pools.

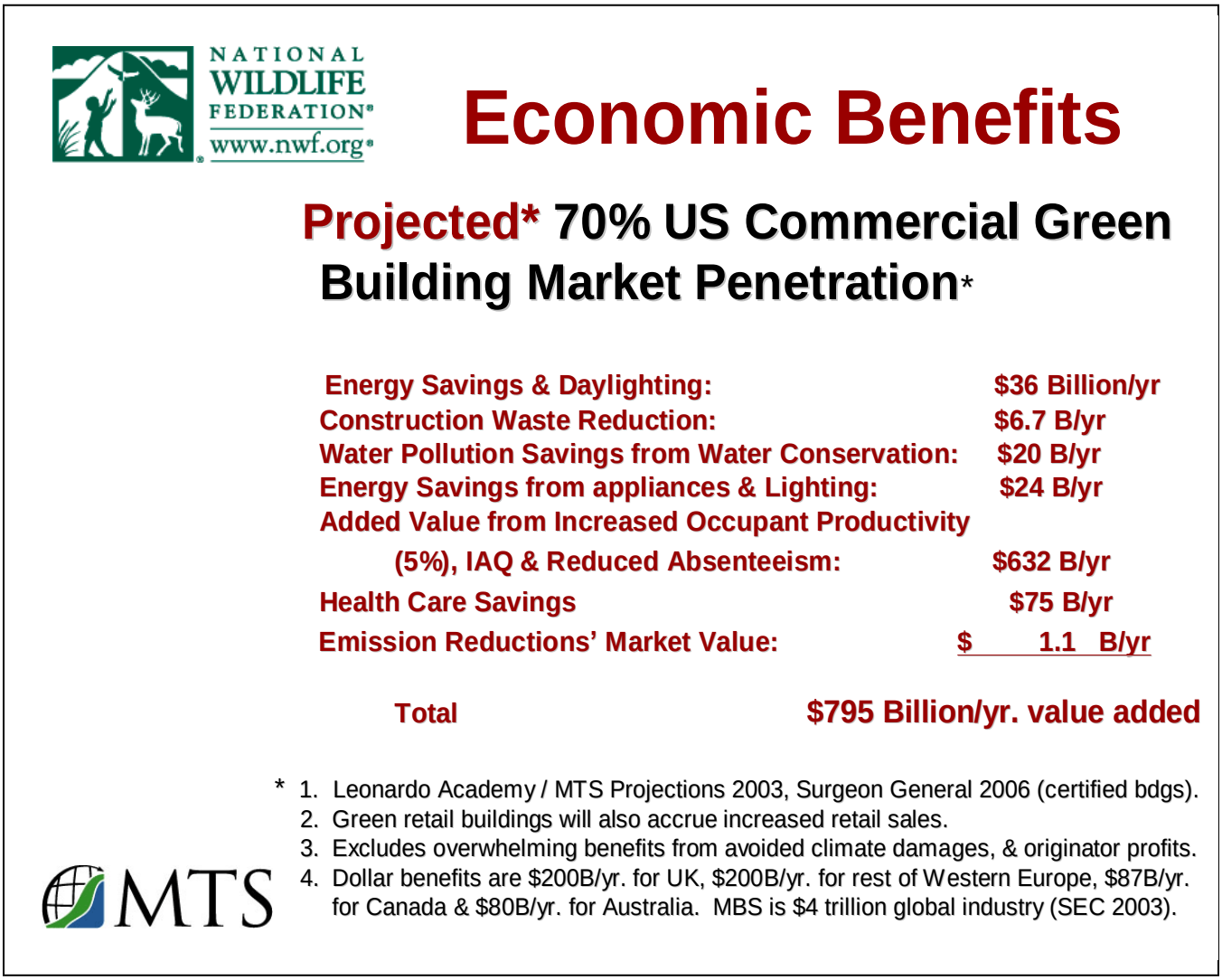
- Secured Discounted Green Building Investment and SMBS Insurance Coverage

Figure 3. Successful Precedent for Sustainable Investment & SMBS



Projected global benefits are an added $1 trillion/yr. to the economy based on successful precedent and quantified benefits based on actual certified buildings (Fig. 4).

Figure 4. Sustainable Investment & SMBS Economic Benefits



There are challenges & solutions:

- limited number of certified buildings - solved by delegating legally binding Third Party certifications to Licensed Architects & Engineers as LEED Accredited Certifiers with aggressive auditing with no sacrifice in quality & huge increase in certifications
- limited number of certified products - solved by initiating competition among manufacturers & providing awareness to Wall Street of documented increased manufacturer profitability

- tipping points not yet achieved for certified buildings & products - solved by already achieved consensus market definition, traction & recognition of substantial added monetary & social value

Wall Street consensus has been achieved for second quarter 2008 Launch of capital markets securities and related investments for climate change needed to force global change.

9. Margin of Safety Specifying Needed Additional Certified Buildings & Products due to:

1. Substantial uncertainties in predicting DAI / Irreversibility
2. Greatly accelerated pollution growth
3. Substantial uncertainties & limitations of adaptation
4. Imminence of likely DAI / Irreversibility and substantial magnitude of predicted adverse impacts to global human health, environment & GDP including *Stern Review*.

"*Uncertainties will continue to be pervasive and persistent*" (Yohe et al., IPCC at 836). "*Another important area of concern, also marked by large uncertainties, is the assessment of impacts resulting from multiple factors*" (Schneider et al., IPCC at 783).

Global ecological and social systems are undergoing multiple stresses from both climate pollution, other pollution, and activities of man including overfishing, water withdrawals, made development; these stresses are projected to worsen with increasing climate change.(Yohe et al. at 816). In fact, only one out of 165 adverse global ecological impacts show a decreasing impact, with all of the others showing either continuing, increasing, or very rapidly increasing adverse impacts (*Id.* Table 20.1 at 817). These impacts include habitat change, climate change, over exploitation and pollution.

"*For biological and geophysical systems, the adaptation potential is much lower. Therefore, some key impacts will be unavoidable without mitigation*" (Schneider et al., IPCC at 804). *And for social and market systems, economic costs of adaptation are potential large, largely unknown, and unequally distributed*" (*Id*. at 782). *Moreover, current knowledge of adaptation and adaptive capacity are insufficient for rigorous evaluation of options, and adaptation measures are seldom taken in response to climate change alone* (Yohe et al., IPCC at 815-6).

The UK's *Stern Review* of the economic impacts of climate change evaluated the full range of impacts and possible outcomes, and concluded the total average unmitigated cost of climate change is expected to be 14% of global GDP (*Id.* at 821) with possible 20% of global GDP/yr. (N. Stern, British Embassy data Sept. 21, 2007).

Nick Stern was the World Bank's Chief Economist and while at UK Treasury was commissioned by then Chancellor of the Exchequer and now Prime Minister Gordon Brown to identify the economic impacts of climate change. Stern reviewed the

significance of his report he led for the UK government ("*Ask the Expert: Sir Nicholas Stern Answers Your Questions on the Economics of Climate Change*," British Embassy, Washington D.C., Sept. 21, 2007):

> *"[C]limate change is the greatest market failure the world has seen. It is an Externality that goes beyond those of ordinary congestion or pollution, although many of the same economic principles apply for its analysis. This externality is different in four key ways that shape the whole policy story of a rational response. It is: global; long term; involves risks and uncertainties; and potentially involves major and irreversible change."*
>
> *"The basic question is whether it is worth paying to avoid the additional risks of higher emissions. In the Review we estimate the cost of avoiding these risks at 1% of GDP per year and the costs of not acting of between 5% and 20% of GDP per year. We should recognise the balance of risks. If the science is wrong and we invest 1% of GDP in reducing emissions for a few decades, then the main outcome is that we will have more technologies with real value for energy security, other types of risk and other types of pollution. However, if we do not invest the 1% and the science is right, then it is likely to be impossible to undo the severe damages that will follow."*
>
> *"The Stern Review did not select the studies with worse case scenarios. It used only peer-reviewed science and all key scientific assumptions have since been endorsed by the Working Group 1 report by IPCC."*

2005-06 Scientific Discovery & Conclusions on Feedback Loops / Climate Change Accelerators. Evidence shows that multiple Feedback Loops were not predicted so soon even though uncertainty was bounded. James Hansen's December 6, 2005 Keeling Talk before the American Geophysical Union, San Francisco, California, introduced the now dominant view that the earth is nearing a tipping point where DAI / Irreversiblity will occur: "*I present multiple lines of evidence indicating that the Earth's climate is nearing, but has not passed, a tipping point, beyond which it will be impossible to avoid climate change with far ranging undesirable consequences*."

Anthropogenic climate change covers exceedingly complex, global scale, interdependent & unpredictable systems with limited useful precedent.

Leading Scientists Including Hansen, Lowered the Safe Level of CO2. At the December 2007 American Geophysical Union meeting in San Francisco, Jim Hansen concluded *"The evidence indicates we've aimed too high – that the safe upper limit for atmospheric CO2 is 350 ppm [parts per million]."* (MicKibben, *The World Has Redlined its CO2 Meter,* Washington Post Jan. 2, 2008).

Current atmospheric level of CO2 is 383 ppm, thus exceeding the safe limit of climate pollution and currently at a Dangerous level in violation of law, placing human health and environment at an unreasonable risk.

Margin of Safety Needed and Specified. Based on the foregoing data and conclusions, a 40% additional margin of safety was proposed for needed reductions for 2008 - 2015. That

is, the number of certified green buildings and sustainable products needed to stop Irreversible DAI is 40% greater than the number simply needed based on emission reductions calculated from guidance by the leading climate scientists. During peer review of this Report, it was recommended and concurred that it be raised to 60% given what's at stake and uncertainty. Thus, a 60% Margin of Safety is used. This is best professional judgment also considering:

- Substantial uncertainties
- Dangerous level of current climate pollution in violation of law presenting an unacceptable risk (33 ppm CO2 above the Safe Level)
- Imminence of irreversibility
- Huge downside risk to the planet
- Little risk of Wall Street acting since -
    - all Wall Street due diligence has been completed
    - national EMERGENCY consensus technology Standards have been adopted by Wall Street reducing risk & uncertainty
    - the Standards have also adopted by hundreds of entities including governments, NGOs and leading web blogs.
    - substantial pollution reductions achieved by the Standards
    - market traction of all Standards
    - based on successful precedent and quantified benefits, SMBS are expected to provide:
        - substantial global economic stimulus
        - positive counter to Subprime crisis
        - added economic value from technologies
        - positive effect on energy and national security &
        - substantial increase in expected Wall Street fees

10. Number & Schedule of Certified Buildings & Products Needed by 2008-2015 including 60% margin of safety. Yearly numbers are non cumulative. Buildings average 200,000 ft².

2008:	.01% of total	Climate Neutral Buildings –	1200
		Green or Energy Star --	1700
		Sustainable Products --	1200
2009:	2%	Climate Neutral Buildings –	23,000
		Green or Energy Star --	33,000
		Sustainable Products --	24,000
2010:	3%	Climate Neutral Buildings –	34,000
		Green or Energy Star --	49,000
		Sustainable Products --	36,000

• **2011:**	5%	Climate Neutral Buildings –	57,000
		Green or Energy Star --	82,000
		Sustainable Products --	60,000
• **2012:**	15%	Climate Neutral Buildings –	170,000
		Green or Energy Star --	245,000
		Sustainable Products --	178,000
• **2013:**	25%	Climate Neutral Buildings –	283,000
		Green or Energy Star --	409,000
		Sustainable Products --	297,000
• **2014:**	25%	Climate Neutral Buildings –	283,000
		Green or Energy Star --	409,000
		Sustainable Products --	297,000
• **2015:**	25%	Climate Neutral Buildings –	283,000
		Green or Energy Star --	409,000
		Sustainable Products --	297,000

Totals:	**Certified Climate Neutral Buildings:**	**1,128,619**
	Certified Green or ENERGY STAR:	**1,632,088**
	Certified Sustainable Products:	**1,184,600**

The preceding numbers of certified buildings and products are calculated based on:

1. Green & Climate Neutral Buildings CO2 Reductions. Average amount of climate pollution reductions for 200,000 ft² certified green building with average 26% conventional energy reduction. This translates to 1.8M pounds or 900 tons of C/yr. Source: EPA ENERGY STAR
   http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_carbon

   This 26% reduction is conservative since LEED Buildings show an average 35% reduction plus 17% of LEED buildings use green power (*Points Achieved, LEED Certified Projects*, USGBC 2005).

   Average CO2 emissions per typical commercial building for 26 US regions is 29 lbs CO2/ft². Average CO2 emissions for ENERGY STAR buildings is 20 lbs CO2/ft², a 31% reduction (ENERGY STAR).

   A 200,000 ft² Climate Neutral Buildings saves 5.8 pounds CO2 or 2900 tons CO2./yr.
2. Sustainable Product CO2 Reductions. Average amount of climate pollution reductions for Gold – Platinum certified sustainable product based on actual certifications with 40% conventional energy reduction for manufacturing facility based on SMaRT Certified Sustainable Products (2008).

3. Building Industry Component of CO2. 4.7 out of 6.2 gigatons /yr. of C emissions come from the building industry or 76% of all emissions (Princeton Wedges; see slide / Fig. 2 above)
4. CO2 Reduction Needed 2008 -2015. Guidance from leading climate scientists: reduce climate pollution through 2015 to global levels stopping pollution growth.

   Initial reductions below 2005 baseline are advisable given that climate pollution exceeded the safe level and is currently Dangerous. See sections 3 & 4 above.
5. 2000 Baseline CO2 Level is 9.081 GtC/yr according to IPCC adjusted for added growth in section 4 above.
6. 2000 Baseline CO2 Attributable to Building Industry was 76% of 9.081GtC/yr. or 6.902 GtC/yr.
7. 2008 – 2015 CO2 Levels Adjusted For Expected Growth. There was a 3.3% annual climate pollution growth rate from 2000 to 2006 (Conway et al. 2007). To deal with rising growth, a 6% growth rate is assumed for 2008 to 2015 to be conservative, since we are at Dangerous pollution levels. Replacing IPCC's 2.4% growth rate with the 6% rate means a revised 3.6% growth rate from 2008 to 2015.
8. CO2 Reduction Needed by 2015. To ensure that climate emissions are reduced to where net levels minus growth start declining, a reduction to year 2000 levels is required, thus below 9 GtC/yr.
9. Total CO2 Reductions Needed from 2008 – 2015. 2015 level of 14.504 GtC/yr. minus year 2000 level of 9.081 GtC/yr., which equals 5.423 GtC/yr. needed. Plus since we are at Dangerous levels of pollution and need to get below Dangerous, there needs to be an added reduction below 2000 baseline so real levels of climate pollution are declining and account for growth. There is no existing quantitative method using actual data to determine this added reduction, thus best professional judgment must be used. Given climate pollution growth beyond IPCC worst case scenario, the delay in achieving meaningful reductions, the huge downside of DAI / Irreversibility, and current Dangerous levels, an added 0.5 GtC/yr. must be reduced making the total reduction from 2008-2015 at 5.923 GtC.
10. Margin of Safety. Section 9 above extensively covers the need for a margin of safety. Again, there is no existing quantitative way to identify this Margin and thus best professional judgment must be used. Section 9 documents that a 60% level is appropriate to use, meaning that an additional 60% more certified buildings and products must be achieved above the level of buildings and products achieving the 5.923 GtC. reduction from 2008-2015.
11. Proportion of Certified Buildings and Products. The building product industry is the world's largest, even larger than the building design, construction, operation and maintenance. Thus, the product industry over the global supply chain which is how sustainable products are defined by law, generates the greatest amount of climate pollution. This pollution comes from raw materials extraction, transportation, manufacturing and supplier facilities, product use, and product reuse or final disposition. All of these product stages are covered by certified sustainable products.

    Accordingly, more climate pollution reduction is achieved if the mix of certified buildings and products is 50/50 since sustainable products reduce more climate pollution than green buildings on average based on actual data.

Since climate neutral buildings reduce on average 69% more CO2 than a typical green building, the mix of certified buildings should be 50% green and 50% climate neutral to reduce more climate pollution.

12. Number of Certified Buildings Achieving One Half of 5.923 GtC Reduction. Half of 5.923 is 2.9615 GtC. A 200,000 ft² green building reduces 900 tons of CO2/yr. The same Climate Neutral Building reduces 2900 tons of CO2/yr. Since half of the buildings should be Climate Neutral, this means that Climate Neutral Buildings should reduce 69% of 2.9615 GtC or 2.04345 GtC. To identify the number of 200,000 ft ² Climate Neutral Buildings needed, 2.04345 GtC is divided by 2900 tons which equals: 704,637 Climate Neutral Buildings needed between the years 2008 – 2015.

To identify the number of 200,000 ft ² green buildings needed, 900 tons is divided into 0.91805 GtC (31% of total building reduction) which equals 1,020,055 green buildings needed between the years 2008 – 2015.

Adding the 60% Margin of Safety, the following number of certified buildings are needed between the years 2008 – 2015:

Certified Climate Neutral Buildings: 1,128,619
Certified Green or ENERGY STAR: 1,632,088

13. Number of Certified Sustainable Product s Achieving One Half of 5.923 GtC Reduction. Half of 5.923 is 2.9615 GtC . On average, a Gold or Platinum Certified Sustainable Product reduces about 4,000 tons of CO2/yr. primarily through conventional energy reductions and green power use at the manufacturing and supplier facilities, organic production eliminating the extraction, manufacturing, and use stages from pesticides, fertilizers and GMOs, and reuse eliminating the extraction and a large portion of the manufacturing stage (MTS certified sustainable product data 2008).

To identify the number of certified sustainable products needed, 4,000 tons is divided into 2.9615 GtC. which equals 740,375.

Adding the 40% Margin of Safety, the following number of certified sustainable products are needed between the years 2008-2015:

Certified Sustainable Products: 1,184,600

14. Ramping Up Certifications. In order to achieve needed efficiencies and economies of scale during the years 2008-2015, the following percentages of certified buildings and products should be used:

2008: .01% of certifications
2009: 2%
2010: 3%
2011: 5%
2012: 15%
2013: 25%
2014: 25%

2015: 25%

11. **Capital Markets Partnership (CMP) Monitoring, Measurement and Reporting of Progress.** Without measuring and reporting progress, preventing DAI / Irreversibility would be achieved just through dumb luck.

Obviously, there is too much at stake not to measure and report progress, and leading CMP government Partners have volunteered to take the lead on this critically important activity.

12. **CMP Will Initiate Any Needed Mid Course Corrections** including acceleration of securities and related investment products

13. **Positive CMP Response to Date to Prevent DAI / Irreversibility:**

- Investment bank, rating agency & investor --
  - recognition of increased economic value for certified buildings & products
  - commitment to launch global securities for these technologies
- $70B in Climate commitments in 2007 alone
- These leadership actions help fulfill capital markets' global legal duty to accurately reflect climate risk (*The Investor's Advocate: How the SEC Protects Investors, Maintains Market Integrity, and Facilitates Capital Formation*, SEC 2006, & Investment Advisors Act of 1940).

Relevant background literature / bibliography:
http://mts.sustainableproducts.com/Capital_Markets_Partnership/Climate%20Science