

Carbon Down Profits Up : Addressing Climate Change



Climate Change
In New York's
Hudson Valley
How can Local
Government and
Community
Leaders Prepare?
Dec. 4, 2006



Contents

- Admitting there is a problem:
 - The so called debate on Climate Change Science
 - Impediment to prudent risk management?
- The Canary in the mineshaft - Climate Change through insurers eyes
- The Magnitude of the Solution
 - Recent Findings – Stern Review
 - Sources of Emissions
 - Brief Overview of Regulation
 - Quantifying what needs to be done – the Wedges
 - What is being invested to date
- Examples of Leadership on Climate Change
 - Introduction to the Climate Group
 - Corporate and local government activities

Slide 2

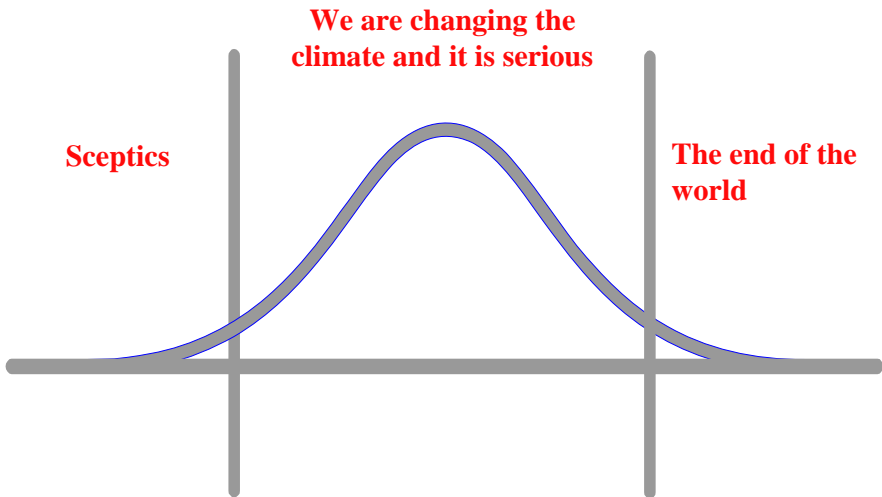




Are Scientists Divided?



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Are Scientists Divided?



928 abstracts, published in/ refereed, peer reviewed scientific journals between 1993-03 analysed

None of them disagreed with the consensus position

0%

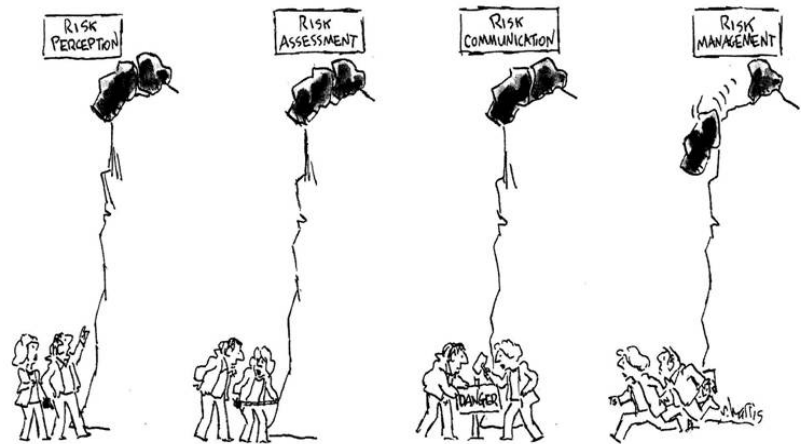
636 articles from New York Times, The Washington Post, The Wall Street Journal, and the LA Times between 1988-02

52.7% gave “roughly equal attention” to consensus & sceptic views.

52.7%

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Addressing Climate Change is it all a matter of Perspective?



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Concentration of Risk

High Density
A = 210 Rooftops



Residential Flood Cover

Freeport (13,819)

2705 policies

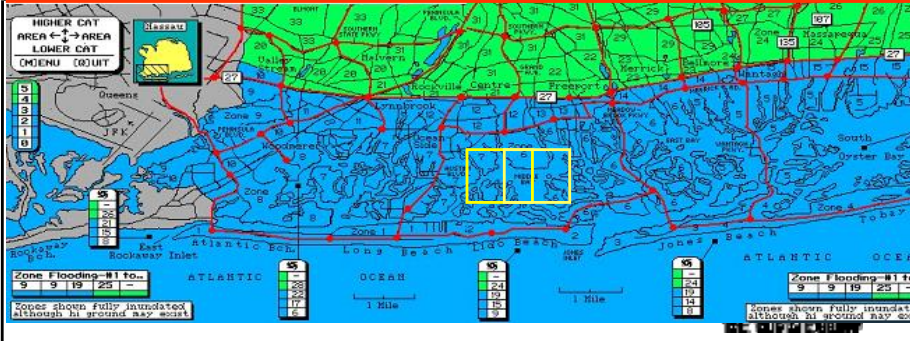
Rockville Centre (9,421)

104 policies

Baldwin (2,718)

19 policies

source: NHC, Google earth
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Weather Related Disasters



Slide 7

■ **The Insurance Industry loss data:** Of the 40 most costly insurance losses 1970-2005:

– 37 of 40 are natural catastrophes; **34 of 37 are weather related**

■ **Timing**

- 2 in the 1970s; 3 in the 1980s
- 18 in the 1990s
- 11 since January 2000 (4 in 2004) +2005

■ For property insurers, 2005 was a record year, mainly due to windstorms: US\$83bn in damage worldwide,

■ Hurricane Katrina cost alone US\$45bn.

■ The 2005 hurricane season broke records: 27 named storms (previous record year: 1933 with 21), for the first time ever, three hurricanes attained category 5

Source: Swiss Re

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Cost and intensity were not the only unusual features of the 2005 Atlantic storm season. Hurricane Vince made landfall in *Spain*, the first ever for the Iberian peninsula. The only other tropical cyclone to hit Europe in recorded history was Hurricane Debbie in 1961, which caused widespread damage in Ireland.

Weather related Nat Cat insured losses 1970 – 2005



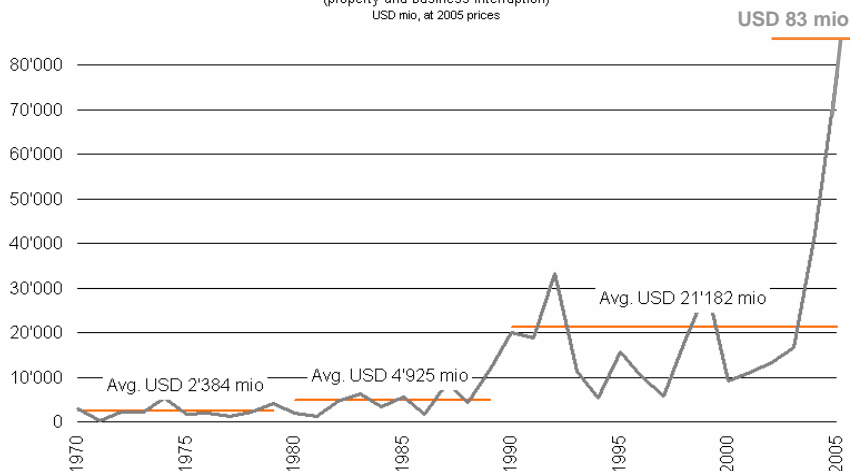
Causes

- GDP growth
- Migration of risk
- Climate variability
- Climate change
- Chance

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Weather related⁽¹⁾ Nat Cat insured losses 1970 - 2005

(property and business interruption)
USD mio, at 2005 prices



Note ⁽¹⁾: Includes storm, flood, cold, drought, hail
Source: Swiss Re sigma Catastrophe database

— Long-term average
THE CHESAIRE GROUP

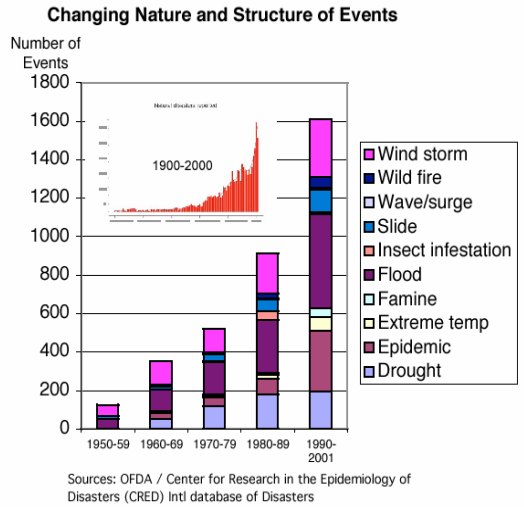
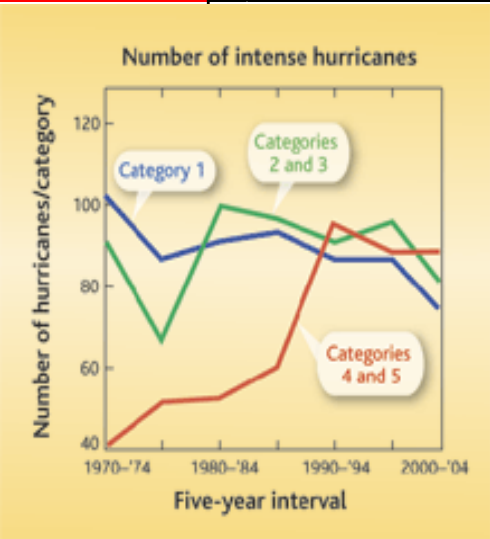
For decades, Swiss Re has tracked natural catastrophe losses from windstorms, floods, earthquakes, droughts, forest fires, and hail in terms of insured property loss and loss of life. We have published annual catastrophic event data on insured property loss and loss of life from natural catastrophes since 1970.

The tracking data illustrated on this graph indicates that insured property and business interruption loss, on an inflation adjusted basis, has been rising dramatically.

Swiss Re now estimates \$83 billion in world-wide Natural Catastrophe insured property and Business Interruption loss for 2005, the highest loss total ever. In fact, we estimate total natural catastrophe economic losses in 2005 at over \$230 billion. Numbers for 2004 were \$49bn and \$123 bn economic

From a public policy standpoint, an important fact to recognize is that nearly two-thirds of the losses were not insured.

Not only are the costs increasing but the severity and frequency as well...

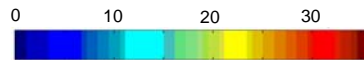
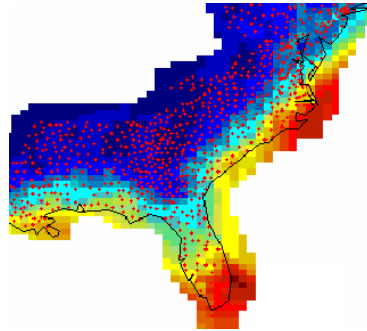


WORLD WILDFIRE GROUP

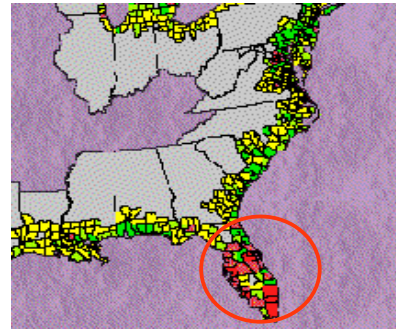
Hurricane North Atlantic – Value concentration



Count of observed hurricanes in the US in the last 110 years



Projected population change 1994-2015



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Source: Swiss Re's Nat-Cat team

Source: National Oceanic and Atmospheric Administration (NOAA)

This chart shows what a major part of the issue is.

On the left, we see the location of the largest concentration of hurricanes is.

On the right, we see the concentration of population in precisely these vulnerable areas.

As long as the brisk pace of economic development continues in storm-prone areas, we can expect increasing economic losses.

■ Coastal areas only comprise 17 percent of the contiguous land area, as of 2003 they were populated by more than half (53 percent) of the nation's population. Over 60% of that growth was in the last 30 years (cool phase)

The Stern Review: The Impacts of Climate Change on Growth and Development



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- Report concludes that: “ **The scientific evidence points to increasing risks of serious, irreversible impacts from climate change associated with business-as-usual (BAU) paths for emissions.**”
 - 550ppm could be reached by 2035 with a 77% chance of exceeding a 2 degree average temperature rise
 - With no action to cut emissions, the temperature rise could exceed 5 degrees by the end of the century, “unknown territory” for humans and greater than the difference between now and the depths of the last ice age.
 - The impacts of a temperature rise:
 - Entire regions experiencing major declines in crop yields
 - Sea level rise threatening 5% of the world's population
 - Collapse of the Amazon rainforest
 - Loss of up to 40% of the world's species
 - **“the overall costs and risks will be equivalent to losing 5% of global GDP. If environmental and health impacts are taken into account the estimates of damage could rise to 20% of GDP or more.”**

THE ECONOMY

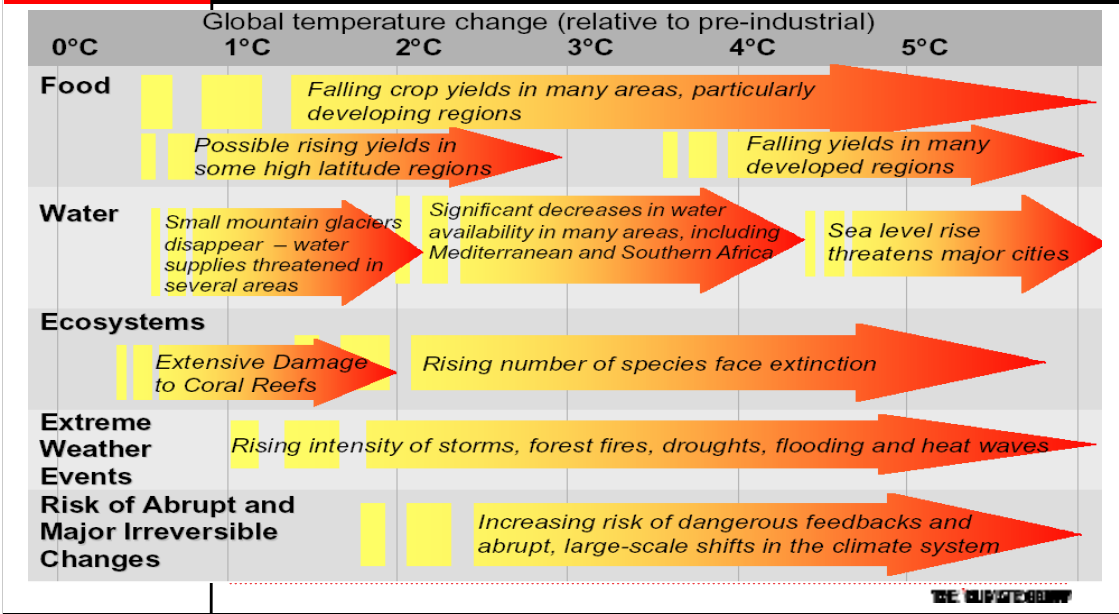
The Stern Review on the Economics of Climate Change was announced by The UK Chancellor of the Exchequer, Gordon Brown, in July 2005 to assess:

- > The economics of moving to a low carbon economy over the medium and long-term, including the costs and benefits of action
- > The potential for adaptation to climate change
- > The implications for energy demand and emissions
- > The economic, social and environmental consequences of climate change.

The report, authored by a team led by former World Bank Chief Economist, Sir Nicholas Stern, was published on October 30th 2006 and represents the first major macroeconomic study into climate change, its impacts and the potential responses. The conclusions of the report can be divided into five broad sections:

- > The impacts of climate change on growth and development
- > The economics of stabilization
- > Policy responses for mitigation
- > Policy responses for adaptation
- > International collective action

Projected Impacts of Climate Change



The Stern Review: The Economics of Stabilization



"We have the time and knowledge to act but only if we act internationally, strongly and urgently."

Sir Nicholas Stern
Former Chief Economist and Senior Vice President for the World Bank

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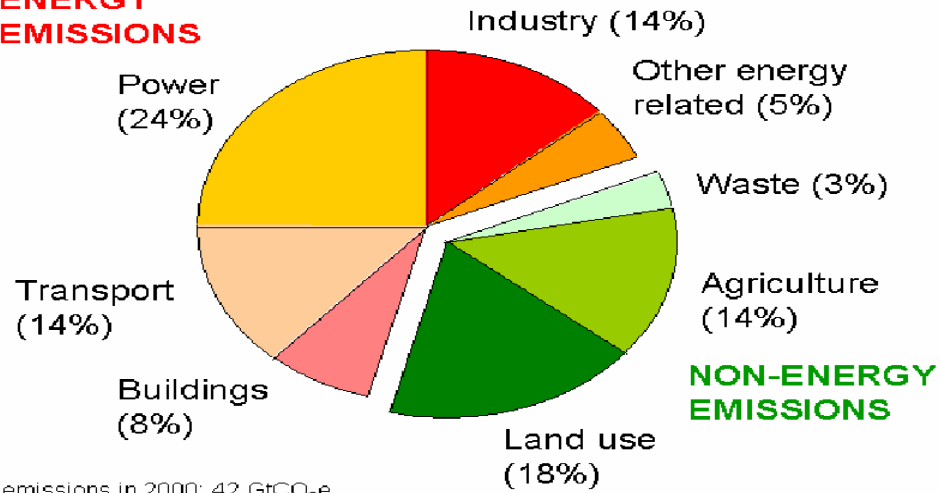
- The emissions intensity of economic activity will need to be $\frac{1}{4}$ of current levels by mid-century, with total emissions at 20% of current levels before the end of the century.
- The cost of action to reduce GHG emissions and to stabilise atmospheric concentrations in the range of 500-550ppm:
 - ***“the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year”***
 - ***“reducing the expected adverse impacts of climate change is therefore both highly desirable and feasible.”***

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Sources of Global Greenhouse Gas Emissions



ENERGY EMISSIONS

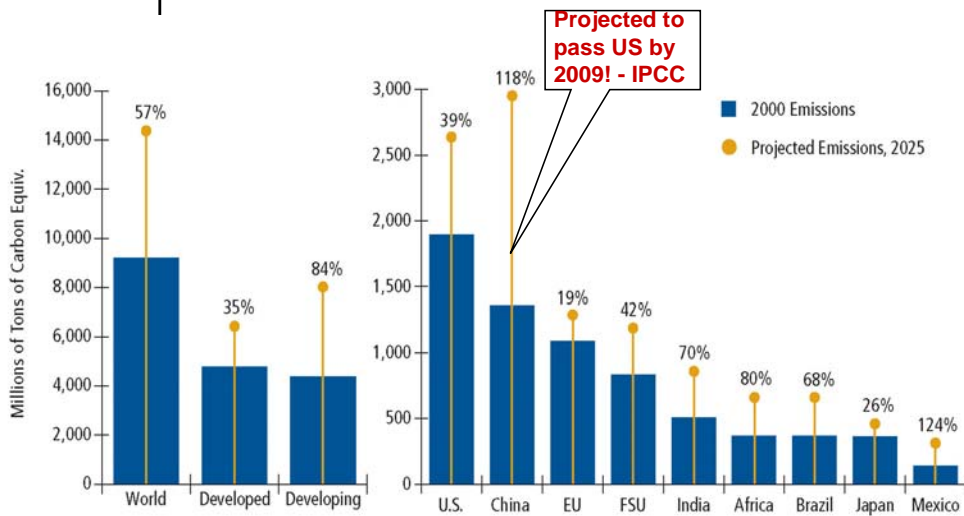


Total emissions in 2000: 42 GtCO₂e.

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Projected Future GHG Emissions Growth



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Placing constraints on emissions:



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- Kyoto addresses 5.2% GHG reduction
 - Climate stabilization: 60% reduction required from 1990 baseline
- Regulatory status - Market Mechanisms approach Intergovernmental Panel on Climate Change
 - Kyoto ratification by EU, Japan, Canada, Russia (150 countries in total)
 - European Union requires compliance by:
 - Utilities (capacity >20 MW) and energy, production/processing of metals, cement, glass, pulp, paper in 28 countries - [12,000 installations](#)
 - Penalty is 40 EUR for excess emissions in 05-07; 100 EUR in 08-12
- Market
 - In 2005, ~~€9.4 billion~~ (\$11.3 billion USD) or 759 million tones transacted (362 Mt ETS and 397 Mt of CO₂e CDM contracted)
 - In 2004, €377 million or 17 Mt traded and 188 Mt CDM contracted
 - Buyers: Primarily EU, Japanese, Canadians
 - EU Allowances – 30 USD; CDM (CERs) – \$8-11 USD
 - Average Emissions Reductions Costs to produce: OECD: >\$50 USD; Developing: \$5-15

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GHG Emissions reductions Trends: United States

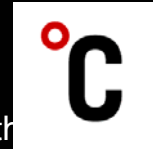


- United States out of Kyoto but...
 - Emissions regulation: (RGGI, California)
 - Emissions targets: Arizona, New Mexico
 - New Congress will likely introduce Federal compliance
 - 2006 - 5 Senate bills introduced
 - Under Republican control in Senate: McCain-Lieberman (43 Senators for in 03); Sense of the Senate Resolution (05)
 - Chicago Climate Exchange (voluntary commitments)
 - Shareholder pressure
- Issue is not *whether GHG emissions will be regulated* but when and how
 - Combination of regulation and voluntary?
 - Industry fears patchwork quilt approach – seeks certainty!

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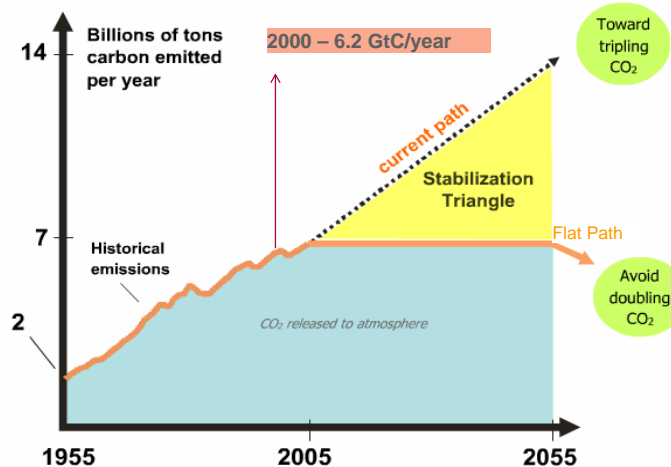
Climate Change – addressing the magnitude of the mitigation need and future requirements for energy growth



If emissions could be kept flat for the next 50 years, we'd be on track to **avoid doubling CO₂** from its pre-industrial concentration.

This new course is predicted to skirt the worst predicted consequences of dramatic warming, but will require avoiding nearly **200 billion tons** of carbon emissions over the next 50 years.

We call the avoided emissions the "**stabilization triangle.**"



Stabilization Wedges: Solving the Climate Problem for the next 50 Years with Current Technologies" S. Pacala and R. Socolow, Science, August 13, 2004 (Princeton University)

But it's vainglorious for the insurance industry to think that the solution will be found in our corner of the capital markets. The real innovations will have to happen in energy.

A recent Princeton study published in Science suggests that the realities are stark. Carbon emissions from fossil fuels have more than tripled since the 1950s. In 2000 – 6.2gtC/year were emitted – 55% from OECD, 10% from Russia/EE and 35% from Developing world.

If the world continues on its current path... that's the upward sloping line... emissions are predicted to double by 2055. This would trip the atmosphere's carbon dioxide concentration from its pre-industrial level.

But if emissions could be kept flat for the next 50 years, we'd be on track to avoid doubling CO₂.

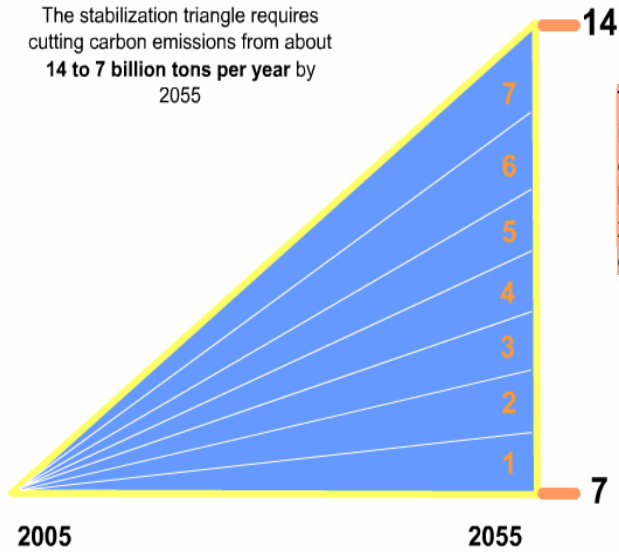
This new course would skirt the worst predicted consequences of dramatic warming. But it will require avoiding nearly 200 billion tons of carbon emissions over the next 50 years.

The avoided emissions are called "the stabilization triangle."

The Wedges: potential approaches....



The stabilization triangle requires cutting carbon emissions from about **14 to 7 billion tons per year** by 2055



This job can be divided up into “**wedges**” that would each reduce emissions by 1 billion tons per year by **2054** or 25 billion tons each over 50 years

As an example: Picking 7 technologies



Need seven 1 GT wedges – thus no silver bullet but a portfolio of material business opportunities

- **Wind Power** – add 2 million 1MW windmills (50 times current capacity or approx. 2 trillion Euro investment)
- **Nuclear Power** – Add 700 1 GW plants (tripling the current worldwide capacity)
- **Energy Efficient Buildings** – Cut carbon emissions by ¼ in buildings and appliances (applying best efficiency practice)
- **Solar PV** – add 2000 GW PV (700 times the current installed capacity)
- **Forestry** - decrease tropical deforestation to zero (saves 0.5 gtc per year) and reforest 300 Mha (new tree plantings which is twice the current rate)
- **Coal Gasification** – repower 1400 GW of coal burning plants with gasification (4 times current production)
- **Biomass fuel for fossil fuel** – Add 100X the current Brazil or US ethanol production (requires the dedication of 1/6 of total current world cropland)

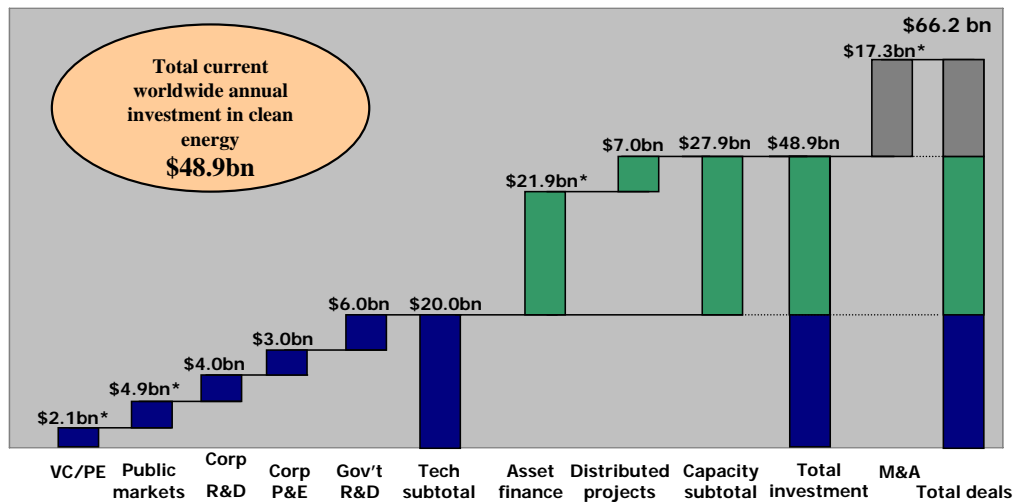
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Wind – space requirement would be the size of Wyoming – 30m hectares

Solar – 2M hectares – size of New Jersey

And currently what is being spent:



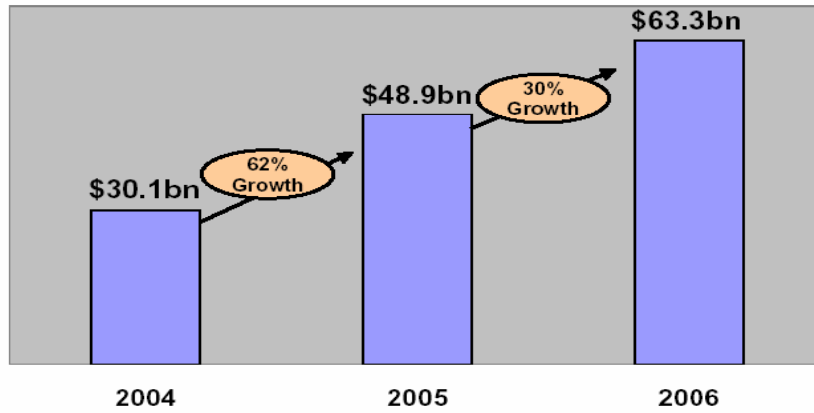
Figures marked * are based on New Energy Finance deal databases; all other figures are industry estimates based on various sources

- ◆ Volume of clean energy investment is big, growing and diversified by asset class, geography and technology
- ◆ Big part of solution is available here and now:
 - Technologies work, or are on track to work, albeit at cost premium
 - Financial markets could sustain substantial increase in investment volume from liquidity/risk perspective
- ◆ However, investment volume is far from volume & profile required to match growth in global energy use
 - Concentrated on wind and solar PV
 - Focused in developed countries – not where it is most needed
- ◆ Many barriers to investment are technical:
 - Stability of incentive programmes, planning processes & regulations
 - Lack of support mechanisms for investment in developing world (failure of CDM)
 - Soft factors: information, skills, incentives of deal-doers

Investment is increasing but
needs to accelerate.....



Global Investment in Clean Energy, 2004 - 2006

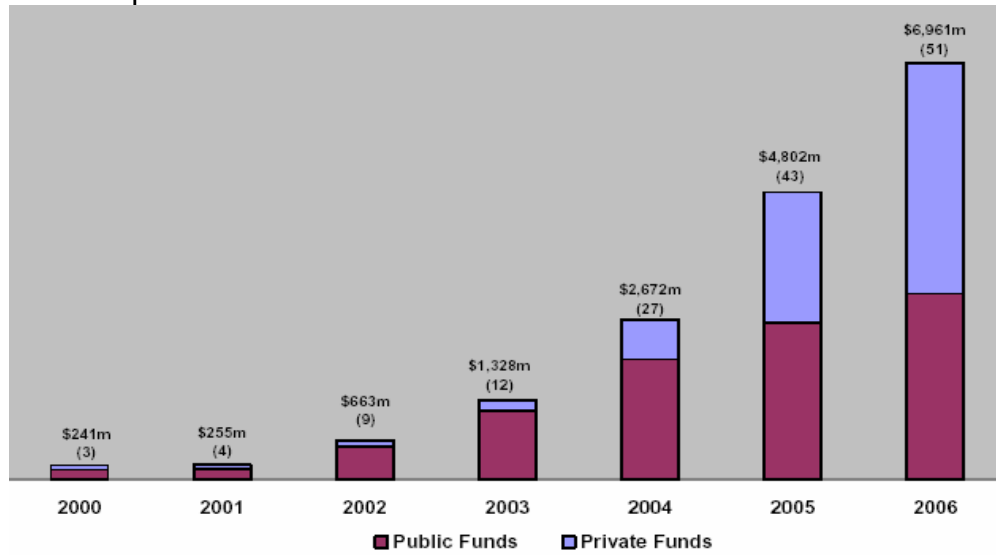


2006 figure is an annualised estimate based on Jan - Oct 2006

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Carbon Funds Under Management



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Snapshot September 2006

WE SUPPLY



The Climate Group



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- **Mission:** TO CATALYSE BUSINESS & GOVERNMENT LEADERSHIP ON CLIMATE CHANGE *in order to put the world on track for a low carbon economy*
- NGO/nonprofit, founded 2003, launched by Tony Blair, in April 2004
 - 80% funded by private funders, 20% via members
- Offices in London, New York, California, Melbourne (soon Hong Kong and Mumbai offices) 20+ staff, network of associates
 - Annual turnover circa £2 million (approx. \$3.7m) growing rapidly
- An appetite for leadership - 32 members (e.g. – AIG, BP, HSBC, J&J, Munich Re, Swiss Re and States of CA, MA, NY, CT, ME)
 - Promote leadership on climate change using communications, research, strategic advice, focused on *how to respond*
 - Climate Academy with Duke and Cambridge Universities

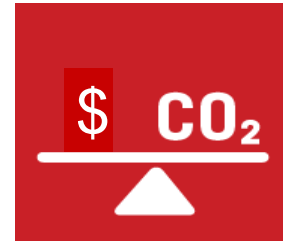
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GAME CHANGING



■ Stimulating the offset market

- **Voluntary Carbon Standard** – launched consultation draft with IETA. Final version for launch Oct 2006
- **Carbon Neutrality Standard & Trade Mark** – under development
- **Carbon Supply Chain** – working with leading retailers to share responsibility across the value chain
- **Game Changing Companies** (e.g. – BSKYB – first media company to go carbon neutral; Virgin – confronting aviation related emissions)



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BASIC Premise

Internationally < 1,000 people can shape the carbon intensity of the world economy

- 10 Prime Ministers/Presidents
- 10 Advisors to Prime Ministers/Presidents
- 30 Energy/Environment/Industry Ministers
- 60 Advisors to Ministers
- 100 Fortune 500 CEOs (most influential in key sectors)
- 200 Energy/Environment/other managers in Fortune 500 Companies
- 40 Mayors & Deputy Mayors in 20 World Cities
- 80 Advisors to Mayors
- 100 Regional Governors/Premiers/Ministers
- 100 Advisors to Regional Heads
- 50 Major Investors
- 40 Editors and correspondents, media

(= 820)

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The Art Of The Possible: Cities



- **BERLIN** reduced emissions 13.8% on 1990 levels by 2000 with €2 million in annual budget relief
- **TORONTO** reduced emissions 42% in municipal facilities between 1990 and 1998 - CA\$20-30 million from landfill methane capture
- **SEATTLE** reduced municipal emissions by more than 60% between 1990 and 2005
- **MELBOURNE** reduced municipal emissions 15% on 1996 levels by 2004

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The Art Of The Possible: Corporations



- DUPONT reduced emissions 72% on 1990 levels by 2003 and saved US\$2 billion
- IBM reduced emissions 37.5% on 1990 levels by 2004 and saved US\$791 million
- 3M 37% reduction in worldwide emissions between 1990 and 2004
- BT reduced energy-related CO₂ emissions 71% between 1991 and 2004. £1.1 billion saved
- Recent Corporate Climate Action Commitments:



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GE - Doubling its revenues from products that provide measurable environmental performance advantages to customers. **Double investment in Clean Tech R&D.** \$1.5 billion pa by 2010

More Ecomagination products each year. Revenues from \$10 billion in 2004 to >\$20 billion in 2010.

Reduce its greenhouse gas (GHG) emissions - 1% by 2012 and GHG emissions intensity 30% by 2008 (both compared to 2004).. billion in 2004 to >\$20 billion in 2010.

Based on projected growth, GE's emissions would have risen 40% by 2012 without further action

Walmart

Target to reduce GHG emissions **20% by 2012**

- \$US500 million pa

-New prototype store 25-30% more energy-efficient

-Increasing US truck fuel efficiency by 25% in the next three years, then x2 in 10 years.

BP LAUNCHES BP ALTERNATIVE ENERGY

➤ Doubling investment in alternative and renewable energies,

➤ A new low-carbon power – **BP Alternative Energy.**

➤ Solar, wind, combined-cycle-gas-turbine (CCGT) and hydrogen power generation, c. \$8 billion by 2015.

Sector and Theme focus



- States and Cities
- Retail & Brands*
- Finance (banking & institutional investors)*
- **New** - Insurance & re-insurance
- Media & Entertainment
- ICT
- Green Power (with WRI) *
- Transport
- Buildings/Infrastructure
- Carbon neutrality

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* work program currently active

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Sky: Getting the Bigger picture



CARBON CALCULATOR

sky THE BIGGER PICTURE

TERRACED

1 2 3 4

Your home and household

1.10 What household energy saving measures have you taken?

<input checked="" type="checkbox"/> Condensing boiler	<input checked="" type="checkbox"/> Loft insulation	<input checked="" type="checkbox"/> Energy efficient light
<input checked="" type="checkbox"/> Cavity wall insulation	<input checked="" type="checkbox"/> Draught proofing	<input checked="" type="checkbox"/> Efficient appliances
<input checked="" type="checkbox"/> Double glazing		

CO2 Explained
You've made better use of energy conservation reducing CO2 and also conserving high quality fuel and energy. You've also reduced energy usage through an energy efficient light bulb, energy efficient appliances and energy efficient light bulbs. You've also reduced energy usage through an energy efficient light bulb, energy efficient appliances and energy efficient light bulbs.

1 2 3 4

Your carbon footprint

3.1 Enter your details and login to compare to previous calculations, or view current results.

Email address: Password:

[Login](#) [View results](#) [Forgot password](#)

sky THE BIGGER PICTURE

Emissions Results **Cost Results**

UK AVERAGE EMISSIONS

10000 to 20000 (kg CO2 per year)

Household: 8.8 tCO2/yr
Work: 5.5 tCO2/yr
Travel: 4.3 tCO2/yr
Total: 18.6 tCO2/yr

YOUR EMISSIONS

10000 to 20000 (kg CO2 per year)

Household: 0 tCO2/yr
Work: 0 tCO2/yr
Travel: 3.3 tCO2/yr
Total: 3.36 tCO2/yr

LOGO AND AWARD



THE CLIMATE AWARDS

Climate Change and the Financial Industry



■ Banks

- CitiGroup - “World’s Largest Bank Makes Huge Step Toward Sustainability”
- “HSBC goes Carbon Neutral”
- Bank America - “Second Largest U.S. Bank sets New Industry Standards on Environment”
- “JPMorgan Chase adopts new best practices on the environment”

■ Investment Banks

- Goldman Sachs – “First investment bank joins growing ranks of global financial institutions addressing urgent environmental and social issues”
- World Bank – Carbon funds \$915M USD under management

■ Investors

- Institutional/pension funds
- Hedge funds

■ Insurers – start of US insurance industry interest...

WILLIS TOWERS WATSON

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The Prototype Carbon Fund - 100M

BioCarbon Fund- \$53.8 million

Community Development Carbon Fund \$128.6 million.

Italian Carbon Fund had risen from \$15 million to \$45 million.

Spanish Carbon Fund \$68 million.

Insurance Industry - Risks and potential consequences



■ Property - Storms floods, droughts etc.

- Business Interruption
- Ecosystems: (e.g. - crop and weather insurance for risks to Food supply and agriculture; Forests and soil)
- Life and Health - disease vector changes, heat waves, public health



■ Corporate and liability exposures

■ Investments - where and how to invest assets

■ New business/product line opportunities

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WILLIAMS TOWERS WATSON & TAYLOR

The negative consequences of climate change... and the risks it presents... are real and widespread. We face a future of potentially worsening chronic risks that could threaten our global prosperity and well-being. There are obvious impacts to people's property and livelihoods from windstorms, flooding, heat waves and other direct effects of climate change. The California Energy Commission points out that in California, this will translate into hotter days, additional smog, sea level rise, and a 15-30% reduction in surface water available for California's cities and farms.

Shifting climate patterns can take lives and pose major public health dangers.

And, importantly, the ecosystems that underlie the economy are feeling the stress also, and are in danger of deteriorating further. Climate change-induced deforestation and soil erosion could devastate entire regions, jeopardizing our food supply and agriculture, along with wildlife on land and off our shores.

This also threatens investment portfolios... whether through impaired returns, lawsuits, or increased operating costs.

Each one of these consequences implicates insurance lines of business: Property & casualty, life and health insurance, crop insurance, business interruption insurance, and directors & officers insurance.

And one outcome we have not mentioned, but that is woven throughout all of these issues, is political instability. Countries experiencing climate-related stresses are going to struggle politically with discontent and disruption.



Example: Hurricane Katrina

Total insured losses are estimated at \$38.1 billion from 1.7518 million claims. Excludes \$2-\$3B in offshore energy losses

Commercial
Property & BI,
\$18,278.0 , 48%



Vehicle, \$2,139.0 ,
6%

Homeowners,
\$17,694.0 , 46%

*As of February 8, 2006
Source: PCS division of ISO.

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ALLIANCE GROUP



Conclusions

- We can stabilise and reduce emissions
 - We need to pursue a wide range of strategies
 - Deferring action is not an option
 - Transport requires smart growth, fuel efficiency, fuel switching
- We need the right market framework: LONG, LOUD, and LEGAL.
- A low carbon economy is inevitable – early movers will gain long term advantage

THE CHESNEY GROUP



THE ^oCLIMATE GROUP

GLOBAL LEADERS FOR CLIMATE SOLUTIONS

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