Natural Capitalism Solutions

THE BUSINESS CASE FOR CLIMATE PROTECTION

When Economists say climate change is real

It's real.

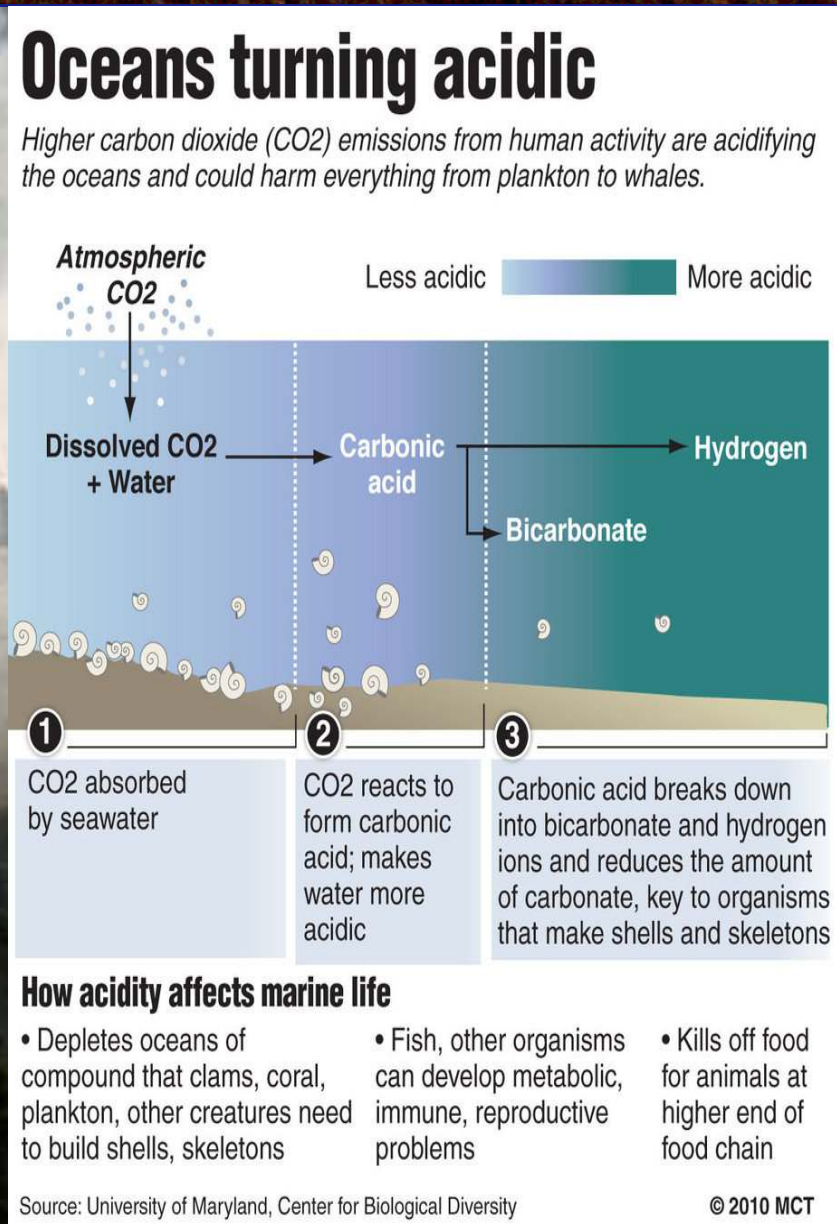
JAMAICA OBSERVER

"THAT climate change poses great risk to Jamaica is no longer debatable...

"Apart from hurricanes, water shortages and droughts are also consequences of climate change which impact the poor and vulnerable within the society."

Monday 14 July, 2014

Global Biodiversity Outlook Three -



2011, a new record: 14 weather related disasters with damages over $1 billion.
2013 6th year in a row with weather related damages over $10 billion

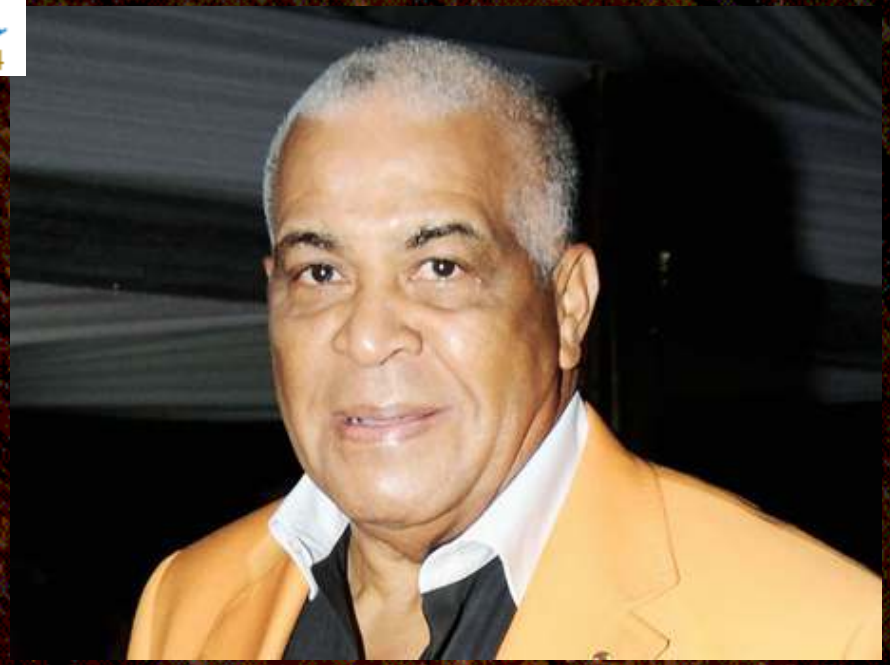

19 Aug 2007
17:45 UTC
Jamaica

"Climate-related disasters trap people into poverty, and urgent action must be taken to mitigate Jamaica's risk. Climate change is already exacerbating inequality, and its impact tends to be most severe in already impoverished areas,"

Failure to incorporate environmental planning as an integral part of national development will have disastrous consequences for Jamaica and increase the chances for climate-related disasters

Ambassador Paola Amadei,
head of the Delegation of the EU in Jamaica
January 2014.

The Gleaner Jamaica WI Established 1834



"It is no secret that climate change poses the biggest threat to our livelihoods and our sustainability as a country

Every unusual event, every flood, every storm, every drought, every incident where extremes of temperatures are registered should serve as warnings for us all,"

By the year 2050, the loss to the mainstay tourism industry in the Caribbean as a result of climate change-related impacts could be in the region of US$900 million.

In addition, climate change could cumulatively cost the region up to US$2 billion by 2053, with the fishing industry projected to lose some US$140 million by 2015.

Robert Pickersgill - at Jan meeting of Global Climate Change Alliance Caribbean Support Project


AP


C34


86
Street

JPS Generation & Power Delivery System

138kV TRANSMISSION LINE

69kV TRANSMISSION LINE

(G) COMBUSTION TURBINE

(D) DIESEL

(S) STEAM

Last January floods following extreme rains

Jamaica is in a profound drought – farmers asked to stop slash and burn land clearing/ Fire two days ago killed a man in St Elizabeth

The UN's
Resilient People, Resilient Planet:
A future worth choosing

By 2030 the planet will need at least
50% more food,
45% more energy and
30% more water.

22-member panel called for a new blueprint for growth and low-carbon prosperity. This must be "mainstreamed" into economic policy as quickly as possible

Jamaica consumes 60,000 barrels of oil per day

84% of energy needs are imported in the form of crude oil.

Jamaica spends more on oil than the country earns:

January – June 2011: Spent $1.48 billion on oil

Earned $1.3 billion

Use expected to double 2027

China has replaced the United States as the world's leading consumer of most basic commodities, like oil, grain, coal, and steel.

- If China's economy grows at its prior rate
- If it uses resources as inefficiently as the U.S.
- By 2030 China will need 99 million barrels of oil a day.

The world currently produces 80+ million barrels per day and may never produce more.

Nov 2011 study from IEA
April 2012 study from OECD
2013 IPCC, IMF, World Bank

Climate change is real and human caused

“Unless world leaders take immediate and coordinated action, modern industry will lock the world into a calamitous temperature rise of up to six degrees C.

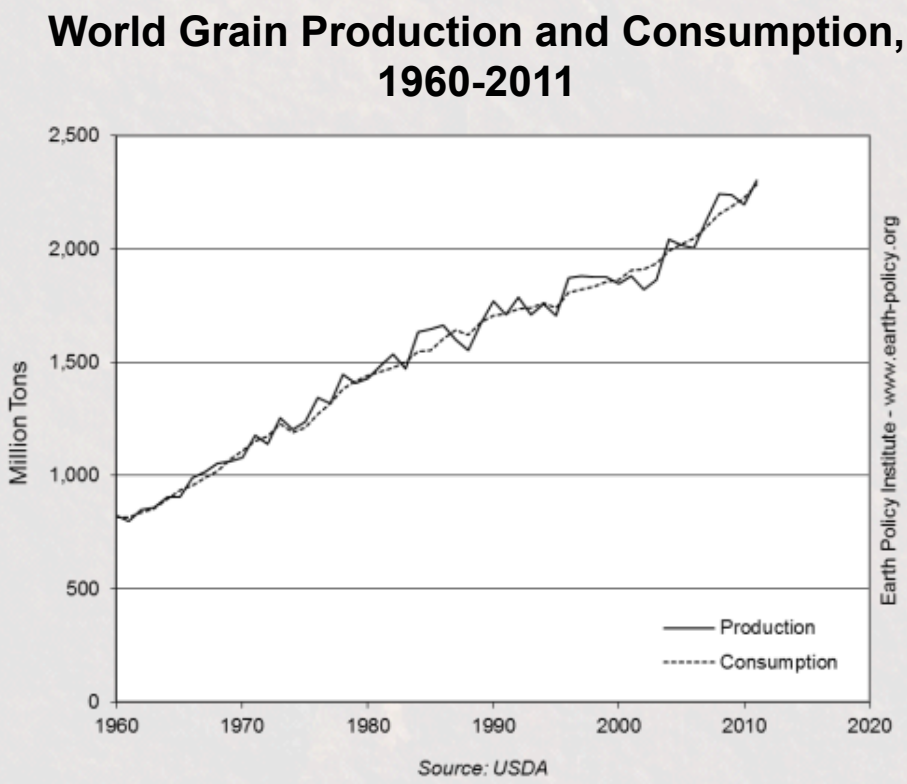
In such a world, demand for energy, food, and water will overwhelm the planet”


REUTERS


SYSTEM


ثورة

Precarious Global Food Situation



- Dangerously small margin between grain consumption and grain production
- Now we face long-term trends that:
  - increase food demand
  - limit food production

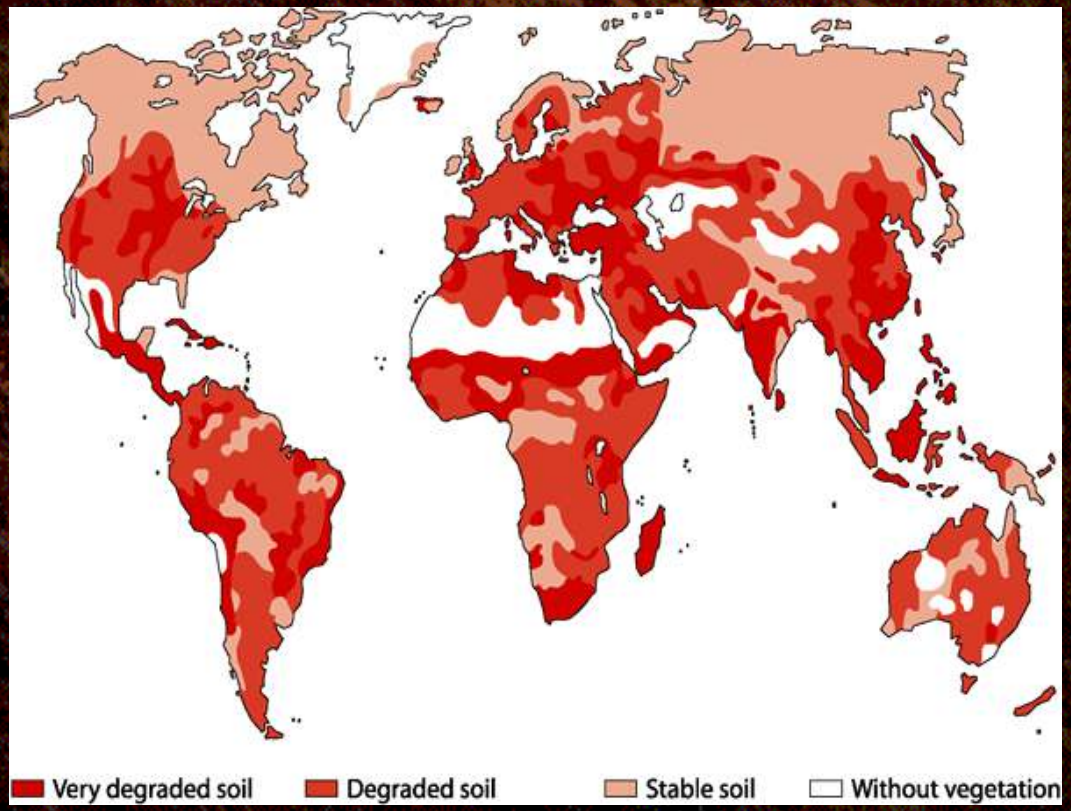
We are only one poor harvest away from chaos in world grain markets.

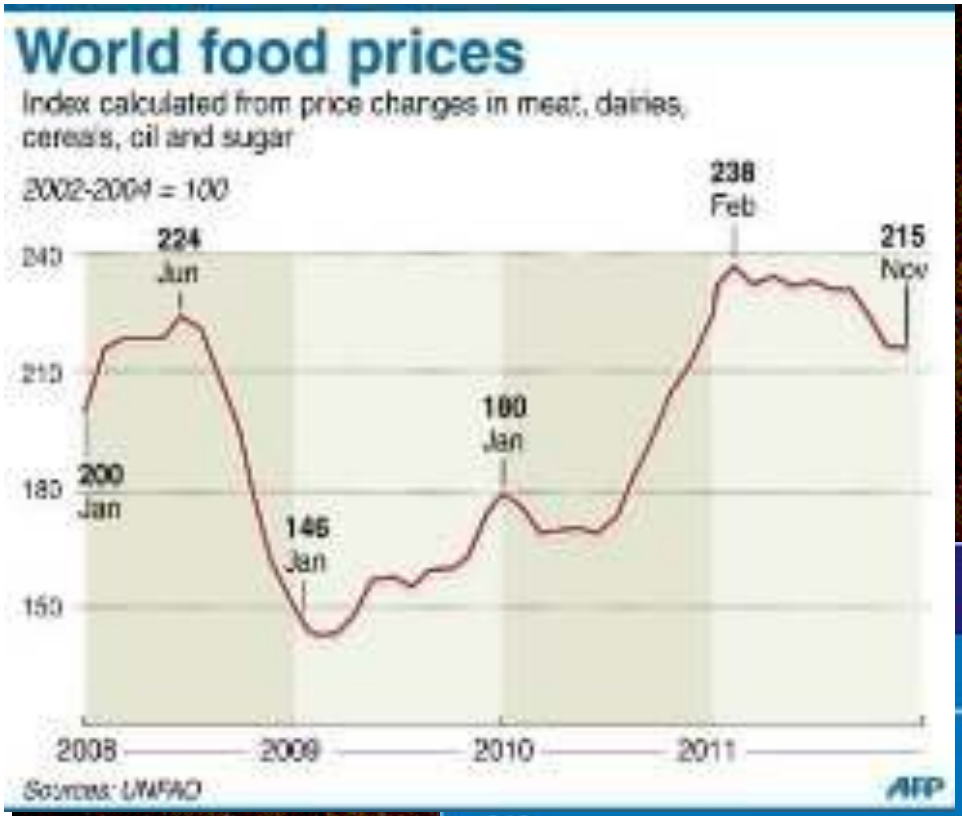
Photo Credit: iStockPhoto / Tobias Helbig

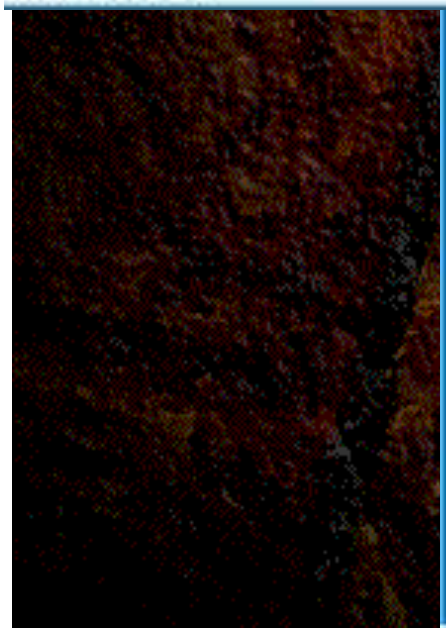
Food and Water Scarcity

More than 33 countries around the world face potential social unrest due to spikes in food prices.

An estimated one-third of the world's cropland is now losing topsoil at a rate that reduces its productivity




World food prices
Index calculated from price changes in meat, dairies, cereals, oil and sugar
2002-2004 = 100
238
Feb
224
Jun
215
Nov
240
210
180
150
180
Jan
200
Jan
145
Jan
2008
2009
2010
2011
Sources: UN FAO
AFP




FAO Food Price Index
Nominal
Real*
210
170
130
90
50
90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11
* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)

The science is uncertain

The science does not matter

Let's assume that the climate sceptics are right

Don't go to the casino on those odds

If all that you care about is maximizing profit, you will do exactly what you would do if you were scared to death about climate

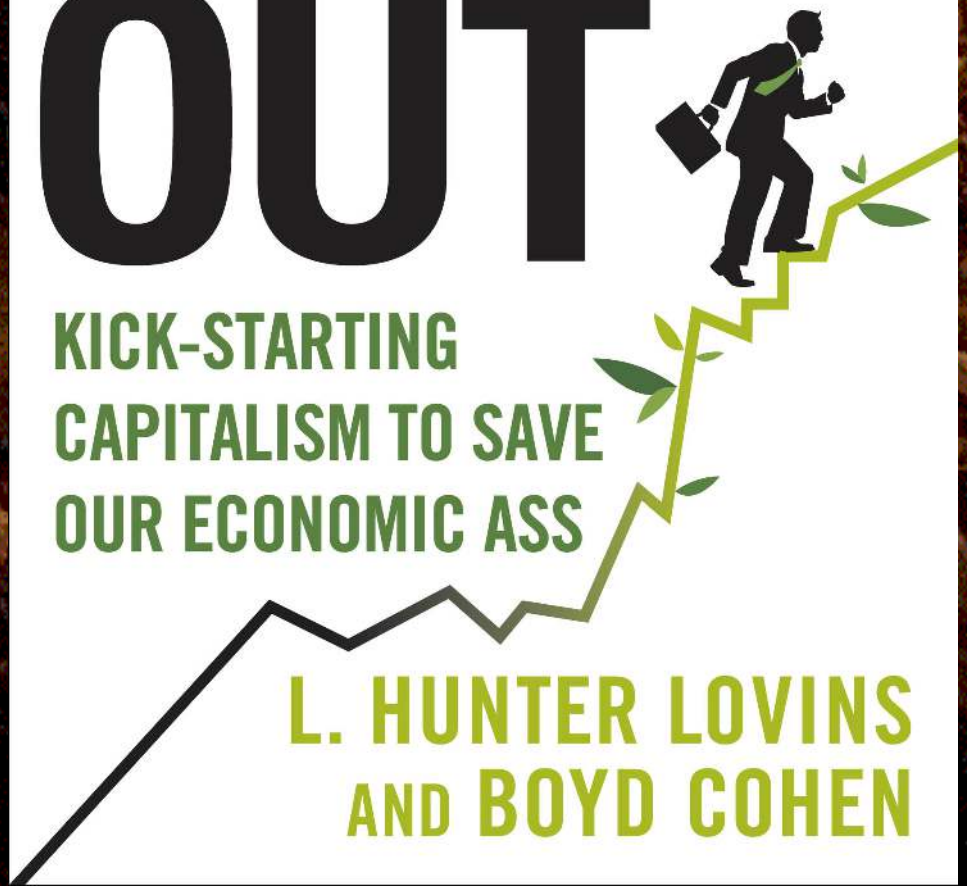
Sustainability is not about the plight of these guys . . .

It’s about business

BY THE COAUTHOR OF THE BESTSELLING *NATURAL CAPITALISM*

"A must-read for entrepreneurs, industry investors, experts, and corporations."
—Jigar Shah, founder, SunEdison, and CEO, Carbon War Room

THE WAY OUT



KICK-STARTING CAPITALISM TO SAVE OUR ECONOMIC ASS

L. HUNTER LOVINS AND BOYD COHEN

We're at 32 GT/yr now, need to get to 14GT/yr by 2050

By 2020 we have to save 17 gigatons of carbon annually to stay below 2 degrees C. and it would be better to stay below 1.5 above historic levels

Carbon War Room

Partnership between Lockheed Martin, Energi,

Barclays, and Ygrene to retrofit commercial real estate.

Will return $4 million in tax revenues for every $1 million $10 million in economic activity generated and 60 jobs created.

The $650 million program will bring its first two cities: Sacramento and Miami 40,000 jobs created, $1 billion in tax benefits, and at least $10 billion in increased economic output

Will scale across US, as well as China.

CARBON WAR ROOM

NEW REPORT: ENERGY EFFICIENCY:

HOW TO CREATE CLIMATE WEALTH THROUGH EFFICIENT BUILDINGS

"TODAY WE ARE ON THE BRINK OF A SIGNIFICANT ACCELERATION IN ADOPTION OF ENERGY EFFICIENCY SOLUTIONS DUE TO MAJOR TECHNOLOGICAL AND FINANCIAL INNOVATIONS."

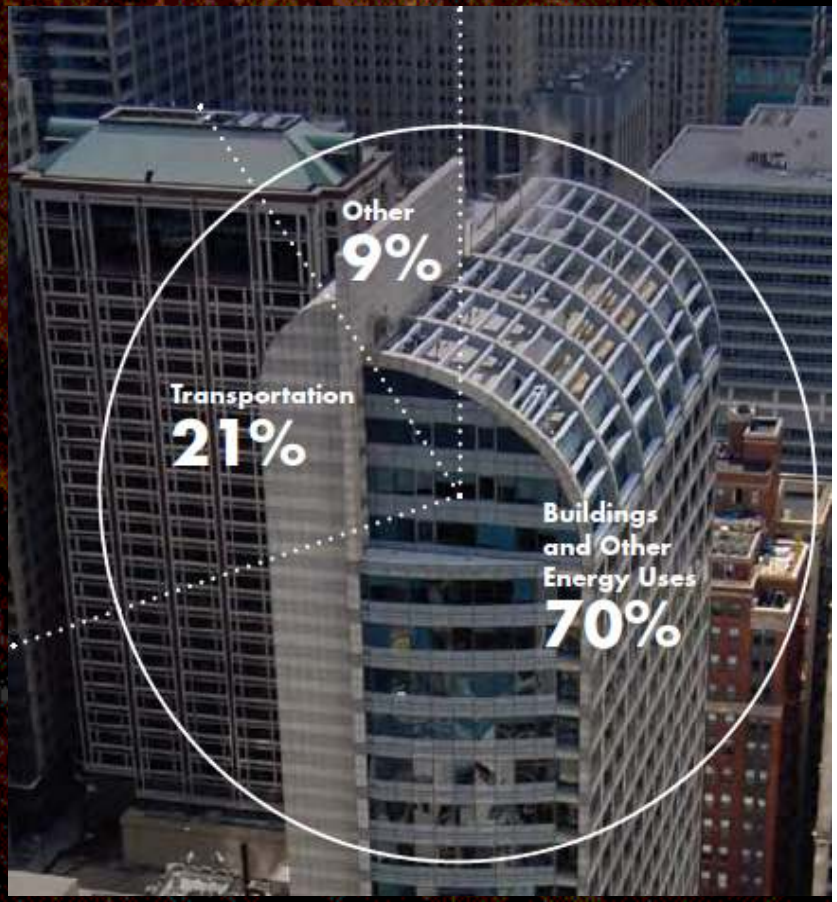
José María Figueres, President, Carbon War Room

Chicago

Goal to reduce GHG emissions to 25% below 1990 levels by 2020; 80% below 1990 levels by 2050

Buildings are the primary target, accounting for 70 percent of emissions.

Chicago is home to 300 wind and solar supply-chain companies and 18,000 related jobs, 13 wind-power corporate headquarters



Building efficiency:
New York City has almost a million buildings.

Reducing carbon emissions 30% in buildings for 20 years would save tens of billions of dollars a year and create tens of thousands of jobs.

New economy for New York to trade for losses on Wall Street.

Wholesale, retail, shipping, manufacturing and retrofitting businesses would all grow steadily to meet the need.

Sales of insulation, caulking, windows, doors, furnaces, boilers, air conditioners and dozens of other products would skyrocket.

Tens of thousands of plumbers, electricians, carpenters, and contractors to make it happen.

10% for free

A growing body of research suggests that the short-term energy savings from behavioral changes is likely to equal or exceed 10%.

6,300 computers and monitors in sleep or standby mode when not in use (24/7).

Leave machines on one evening a week for updates and turn them off at the end of the work day: $700,000.

US companies waste $2.8 billion a year on 108 million unused PCs. In 2009, these unused PCs will emit 20 million tons of carbon dioxide emissions – the impact of 4 million cars.

PC power costs are the largest single factor of IT energy costs and can account for a quarter of the costs in a modern office building.

“Ford Saves One Million Dollars...
By Shutting Off Computers”
Fast Company, 23 March 2010

Turning off one computer every night for a year saves $34
If 20 computers are left on in the evening and over the weekend, the savings grow to $526 a year

Ohio State University

Turning off computers at night, saved the University over $250,000 a year.

This money is used for academic programs across the campus

7M square feet DC with 500 Watt roof lights evenly spaced every 10 feet. Half the floor space was racks with boxes.

Most of this lighting was either unnecessary or redundant. Work areas had task lighting at the employee level.

Annual savings for shutting off the lights... $650,000.

New study by CDP shows that U.S. businesses cutting emissions by 3%/ yr, would drive savings of up to $190 billion per year by 2020 and curb climate change.

GHG Policy = Competitive Edge

Business Leaders	Reduced Emissions	Savings
Dow	↓ 20%	$4 BB
BRITISH TELECOM	↓ 35%	£ 1.5 BB
ABN AMRO	↓ 15% since 2004	3.5 MM Euros

GHG Policy = Competitive Edge

Business Leaders	Reduced Emissions	Savings
IBM	↓ 38%	$786 MM
ALCOA	↓ 37%	$7 MM
WESTPAC	↓ 45%	$100 MM

Economic Realities:

Saving energy strengthens the entire economy

Table 9: Economic Impacts per Average Megawatt Savings

Economic Impact Measure	Impact per aMW Saved
Output	$2,230,572
Wages	$684,536
Business Income	$125,882
Jobs	22

Source: Calculated by ECONorthwest using 2002 Energy Trust spending and energy savings impacts.

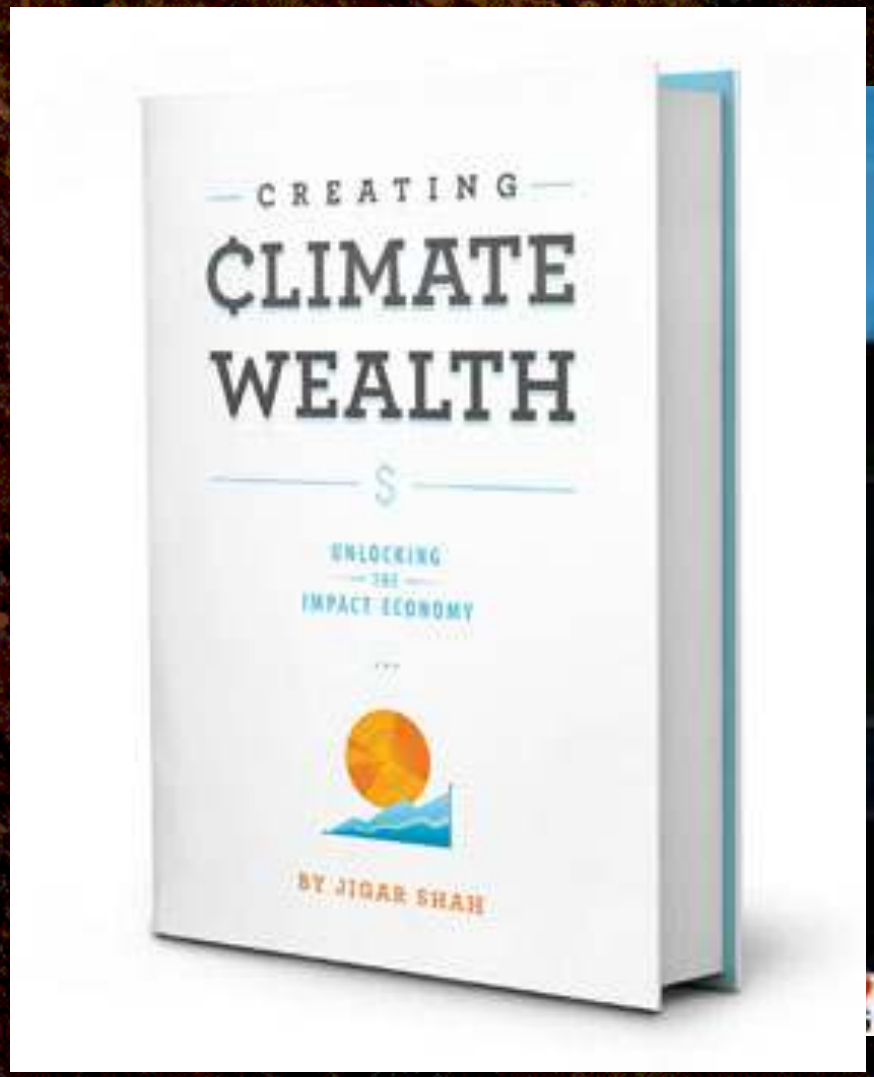

CDP
DRIVING SUSTAINABLE ECONOMIES
NYSE
EURONEXT
SEPTEMBER
23
MONDAY

2008 – 2012 leaders in reporting/ managing carbon emissions information achieved 5.2% higher return on equity, 18.1% greater stability in cashflow generation, and 1.6% higher growth – twice the average total return vs the Global 500 from 2005 - 2011

Creating Climate Wealth

100 x 100 = $10 trillion

Worldwide challenge to solve climate change. We need the equivalent of 100,000 companies to sell $100 million worth of climate change solutions by 2020. The result: a new $10 trillion economy.



Jigar's Climate Wealth Law

Due to continuous technology innovation ~50% of the greenhouse gas emissions will **always** be profitable to eliminate – held up only by lack of effective business model and financial innovation.

Researchers at Stanford have shown that the US and indeed the world can meet its needs with 100% renewable energy.

Renewables and efficiency get results quicker than through pipelines and offshore drilling.

Renewables Win

Solar added 1.7 GW in 2011, up 2x from 2010
3.3 GW in 2012 – 76% growth, prices fell 27%, 70% in last 3 years

39 GW in 2013, doubling every two years

Nuclear added 0 and coal decreased.

Japan added 9.5 GW of solar in 2013 – has a feed-in tariff

China is investing 2.4 billion in renewables, installed 14 GW solar 2013, 2014 projected

Plans to have 100 GW of wind, 21 GW of solar and 13 GW of biomass power installed by 2015

70+% of new power generation capacity added between 2012 and 2030 will be from renewable technologies.

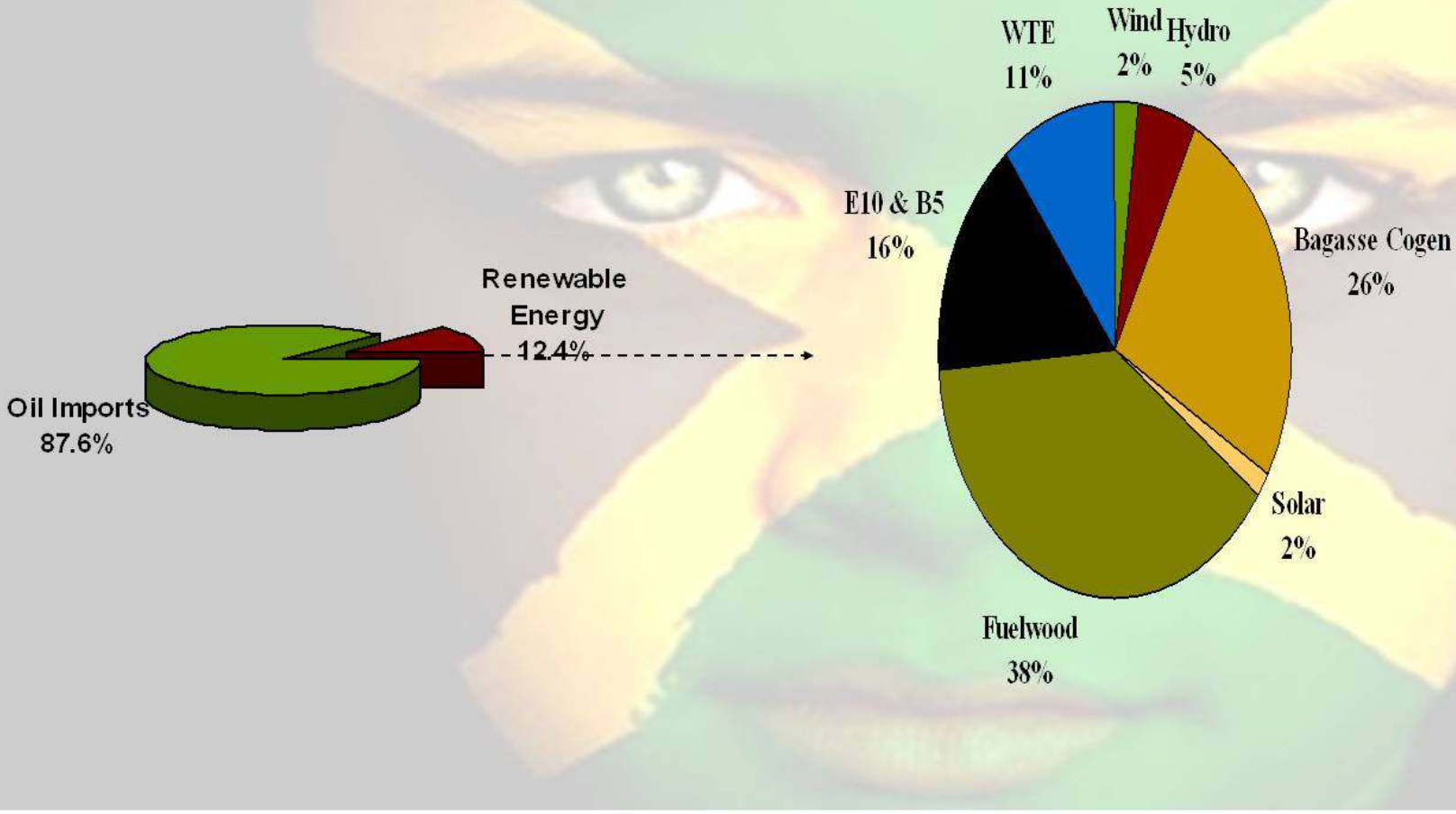
Butte College – 75% renewable

Could be first college in the U.S. to generate more electricity than it uses.

It would gain $50-$75 million for academic programs if PG&E would let it.

World now nearing 100 GW solar

2015/16 Barrels of Oil Equivalents by Renewable Energy Sources



FUTURE: R.E. VALUE US$273 M/Yr

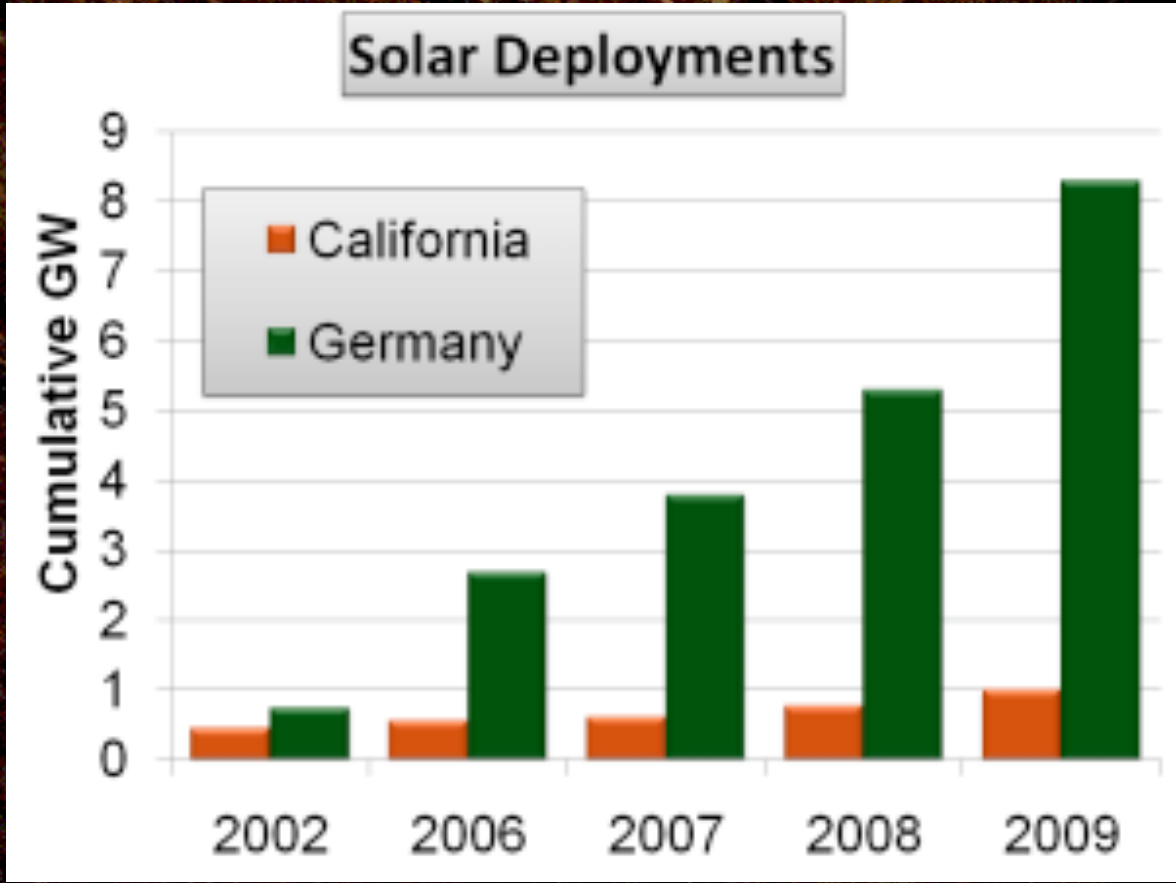
Sandals Eco-Village in Mo Bay

Solar deployment – policy matters

California receives 70% more sunlight for producing solar energy than Germany.

But Germany installs 28 times more solar electric capacity every year

Will be 100% renewable by 2050



The Economics of Feed-in Tariffs

Deutsche Bank Study: FiTs gave Germany the lead in renewable energy production.

FiTs created 1.2 million jobs in cleantech and a 25% GDP growth that has come along with the 25% emissions reductions Germany has achieved since 1990.

FITs cut the unit cost of solar panels 30 percent in 2009 enough that they could pay for themselves within five to seven years, and reach grid parity (costing the same as grid electricity) by 2013.

FiTs drove German economic regeneration, enabling Germany to pay its own citizens to produce, install and maintain their own renewable energy systems, instead of buying imported fossil fuels. The program cost of €2 - 3 per month ($50 to customers' electricity bills each year) to electricity bills in Germany (a total of €8.6 billion.)

Deutsche Bank: The savings created by FiTs exceeded total cost of payments made by households.

Had customers bought electricity from conventional generation and paid the costs of fossil fuel generation Germans would have paid over €9.4 billion.

Dardesheim, Germany - 100% renewable

Wildpoldsried produces 321% more energy than it uses; makes $5.7 million each year

BAVARIA HAS MORE INSTALLED SOLAR CAPACITY THAN THE ENTIRE UNITED STATES.

Electricity Grid

Traditionally, electricity has flowed one way; from a power station to a customer.

Renewable energy enters the network from multiple locations, through distributed generation.

Legislation passed in California in 2002 allows local communities to purchase power from their own preferred sources

Overwhelming support for green energy sources in Marin County lead to the formation of Marin Clean Energy (MCE), which provides the community with “cleaner, greener energy”

MCE purchases power from renewable sources.

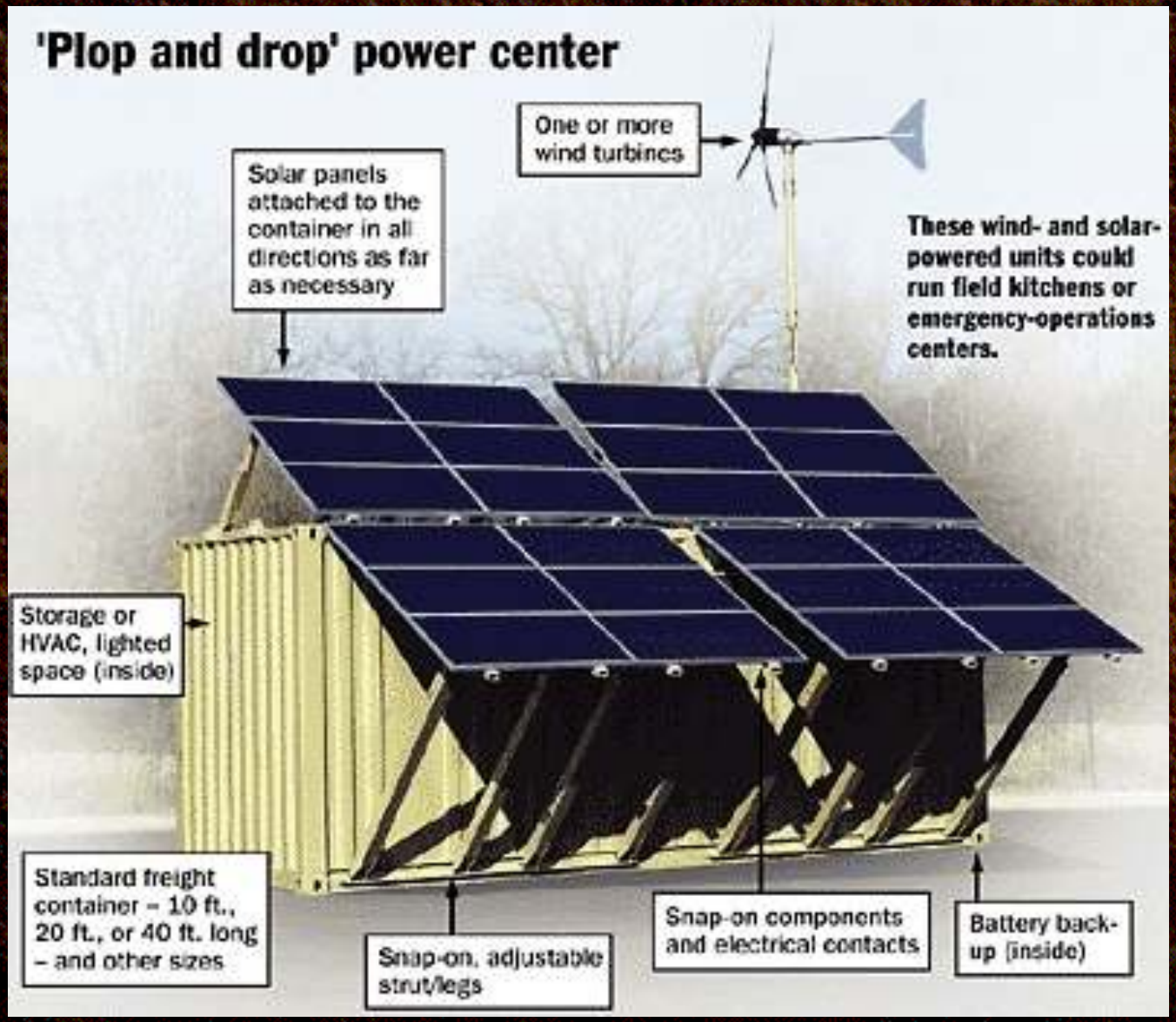
Users can choose “Light Green” plan: 50% regionally local, renewable energy or

“Deep Green” 100% regionally local, renewable.

Available in all cities in the county of Marin

Marin ratepayers will save $240 million over the next twenty years.

CIA's comms center



Wind is the 2nd fastest growing energy supply technology in the world:

37 GW in 2009, 32 GW 2010
Now 237 GW, 40 GW new 2011
Costs less than coal in good sites

Wind Power

35 percent of new U.S. electric generating capacity came from wind from 2007-2011

Less than 15 percent of new capacity came from coal

The Wigton Windfarm in Manchester

Hybrid Wind and Solar Energy Project Installed in Kingston

Last October, JP offered customers the opportunity to buy a Solar Mill

Beaver County Utah

Beautiful but economically struggling part of Utah

No coal

Rob Adams: You sell what you have

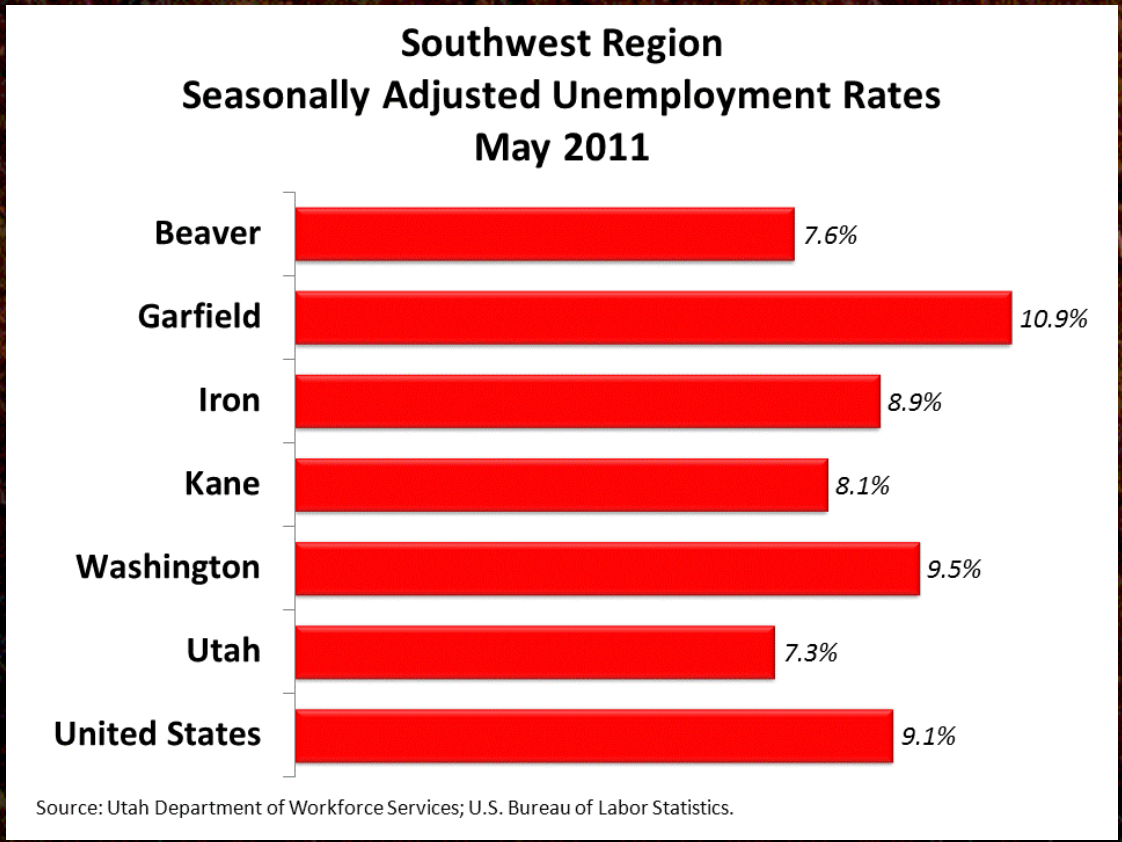
2009 First Wind completed 203 MW wind farm in the Milford Corridor. 97 turbine farm will supply power for 45,000 homes.

2010 First Wind gave first local scholarship

Bellnap School once condemned, was rebuilt

First phase: $85 million in economic benefit – 250 jobs

Tax base went from $60 million to $3 billion – because the jobs are high paying



Fuel from whisky

Rothes whisky distilleries using dregs and pot ale from distilling process to generate 7.2MW of electricity, the equivalent of powering 9,000 homes, Glenkinches making butanol

Diegeo has achieved the holy grail of carbon reductions: 80%

Without offsets, 38 years earlier than they had to

In 2008 Execs of the $17 billion spirits company decided to act
100% cost too much, hundreds of millions of dollars

So set goal of 50% - no idea how to do it

Richard Dunne started with no-brainers, achieved 50% in 4 yrs
lighting retrofits, boiler upgrades, variable speed drives;
switching fuels (from oil to natural gas) reducing from two
boilers to one in a small distillery.

Landfill to gas at 1 Canadian distillery – too expensive for its
budget, took the entire global operation to 80% reduction –
used savings to cover expenses

Great Green Fleet

Navy Secretary Ray Mabus: "We simply have to figure out a way to get American-made, home-grown fuel that is stably priced, that is competitive with oil,"

MH-60 chopper flying on 50-50 algae/ grease biofuel and petroleum fuel

Deploy a biofuel-burning carrier group by 2016 and require the Department of the Navy to get half of its energy from alternative sources by 2020.

Fuel from Algae

Solazyme - Jonathan Wolfson

2010 - Solazyme's algae derived Naval distillate fuel successfully demonstrated in ships

USS Ford frigate used 25,000 gallons to sail 12,000 miles from Everett Wash to San Diego – no difference in performance Solyazyme and Dynamic Fuels

F-18 Green Hornet flying on Sustainable Fuels' oil seed fuel/ jet fuel mix – 60 – 75 million barrels of jet fuel/ year

Harbec Plastics

Is an injection molding company.

Their production facility was at the end of a utility line, and power fluctuated often.

Every time it fluctuated, they lost a batch.

This was making them lose competitiveness with Asian companies.

- Completed energy audit
- Simple replacements: light bulbs, inverter drives…
- Installed a small power plant that produced twice the plant's requirements
- Converted to all-electric molding equipment - draws power only when needed (cut GHG emissions in half)

Harbec Plastics

2 weeks after this investment, the Northeast blackout happened (2003)

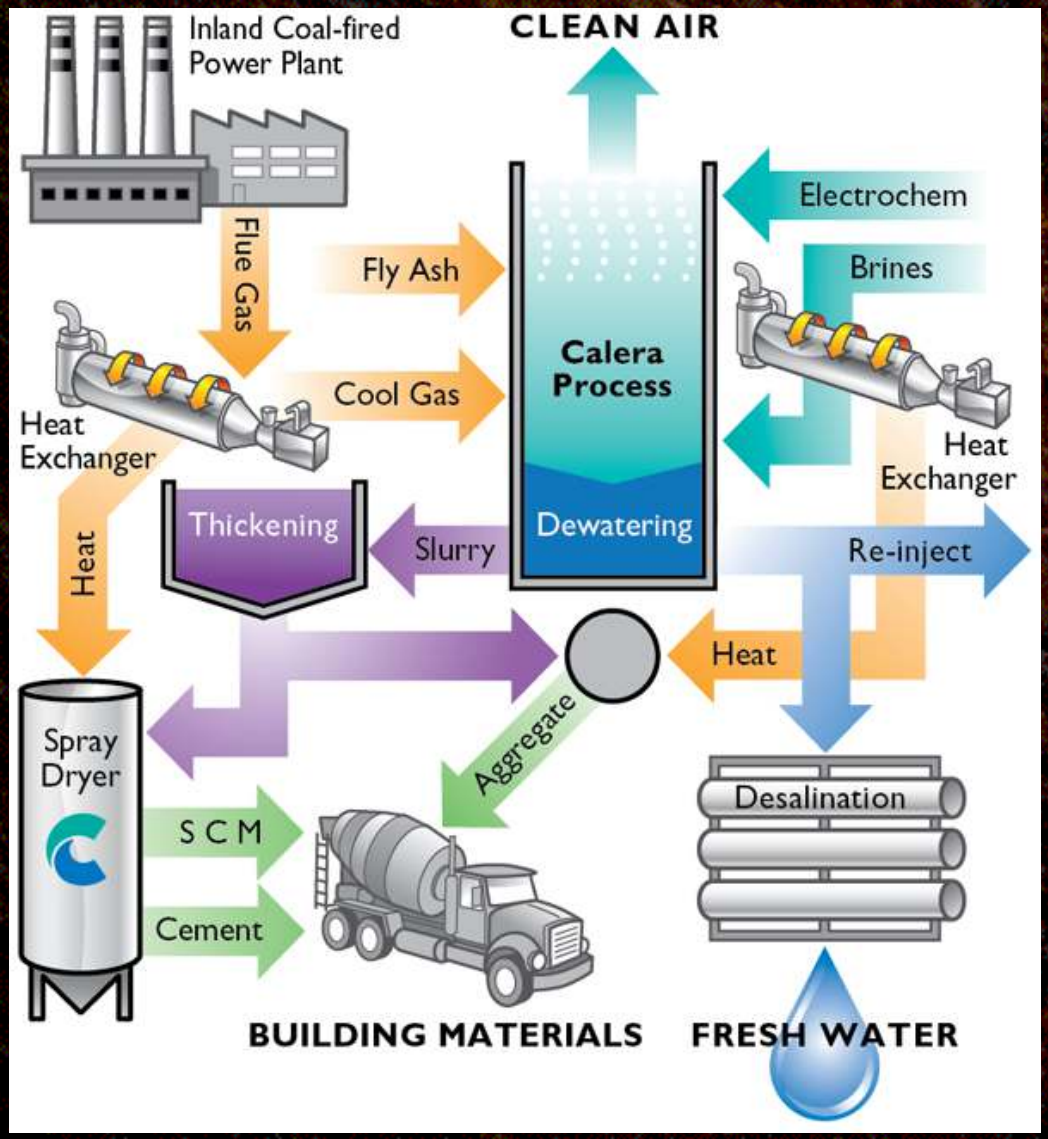
Companies in the area were losing $25,000 an hour due to outage.

Harbec just kept motoring along. This paid off the entire capital cost of their new green building.

"I may be the only injection molder in NY who can go to customers and talk about energy costs going down, in an industry where energy represents a significant portion of the cost of doing business."

- Bob Bechtold, Owner

Calera

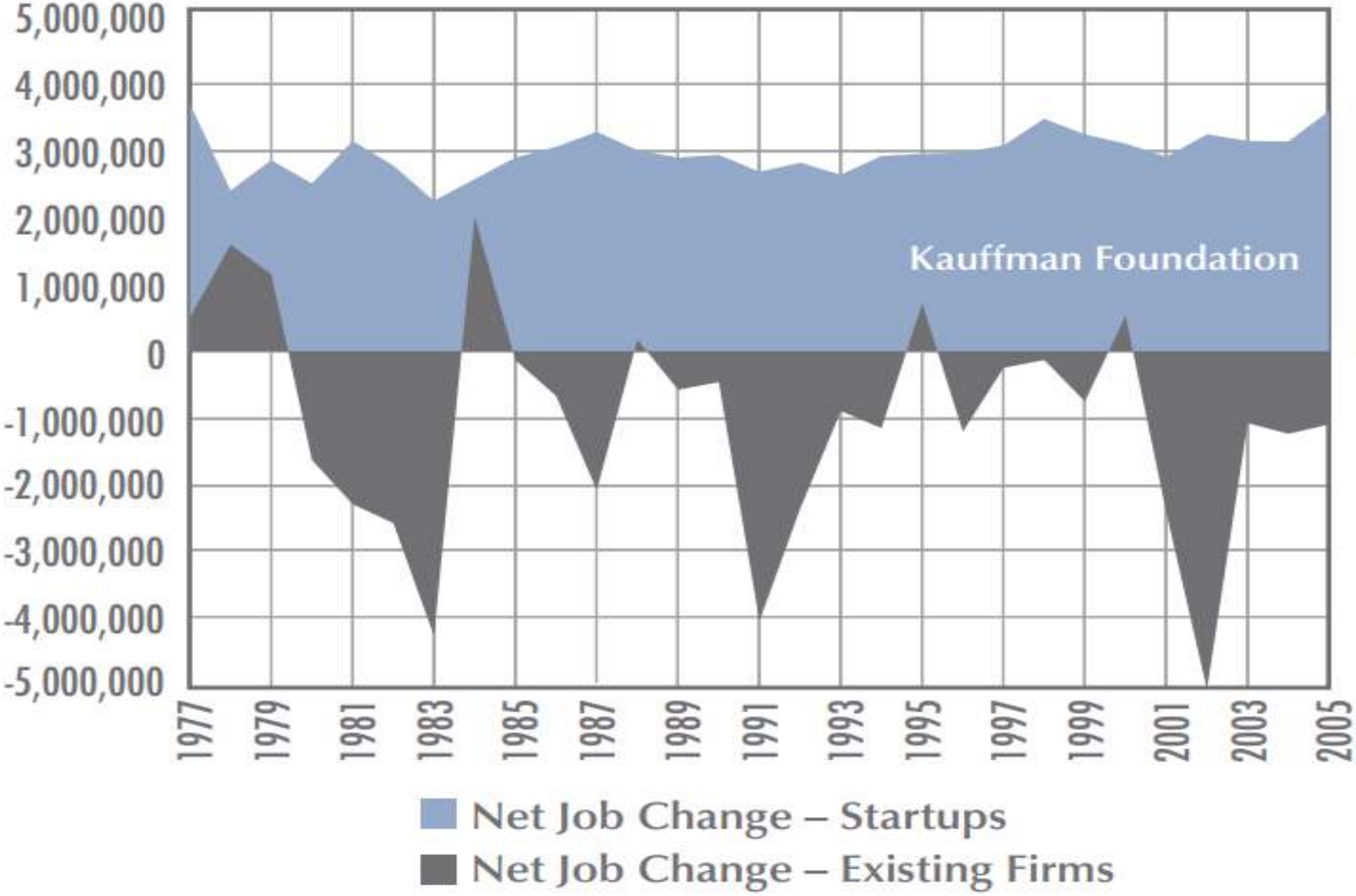


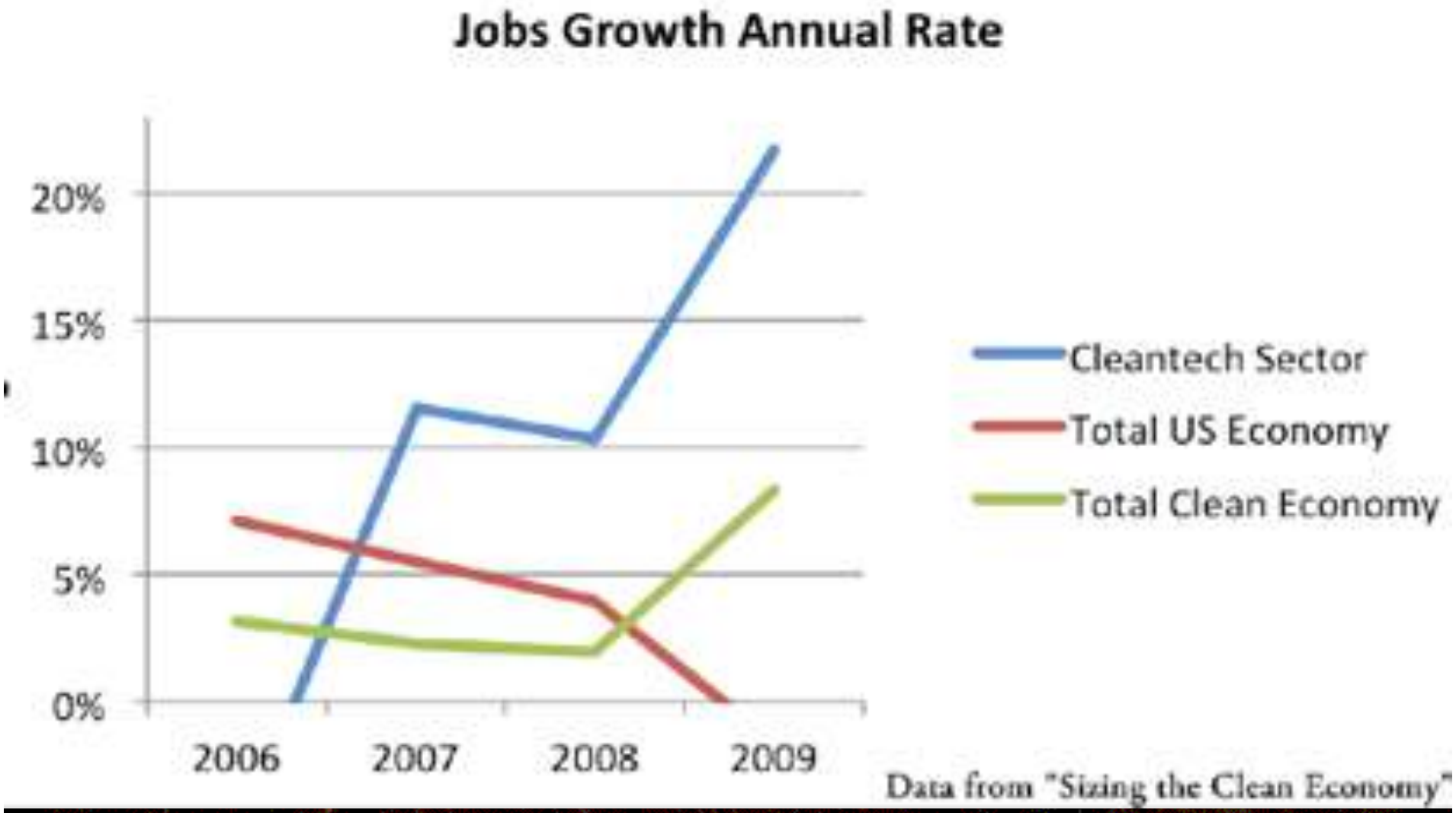
Calera is piloting making cement in the same way that coral reefs make limestone: CO2 and seawater.

Carbon negative process.

Vinod Khosla is a lead investor

Startups Create Most New Net Jobs in the United States




Jobs Growth Annual Rate
20%
15%
10%
5%
0%
2006
2007
2008
2009
Cleantech Sector
Total US Economy
Total Clean Economy
Data from "Sizing the Clean Economy"

Regenerative Energy Economy in U.S.

Employs almost 3 million - more than fossil fuel

Outperformed general economy in recession

Offers better opportunities, higher pay for low and middle skilled workers median wages 13% higher

2012 solar jobs increased 13.2%, expected to rise 17.2% in 2013

Green jobs increased five times faster than jobs in any other industry

Solutions at the Speed of Business

Lighting

Daylighting, Lighting Controls & Lighting Equipment

Heating & Cooling

Insulation, HVAC

Water

Water Use & Water Heating

Waste

Reduce, Reuse, Compost & Recycle

Transit & Travel

Transit Alternatives & Business Travel

Lighting & Power Strips

Install LED Task Lighting
& Reduce Overhead Lighting

ROI = 87%

Use Smart Strips
ROI = 300%

Total Cost = $6,000
including labor

Savings = $7,350
(per year)

give something back®
BUSINESS PRODUCTS

New York Beverage Wholesalers, Bronx

Solar panels saved over $3,000 annually

Nissan PL35 forklift saved $800 in fuel

21mpg Diesel Dodge Springer saved $4,000/yr

Saved $230/yr while using only ½ of the lights

Photos by Brad Trent

THERE IS NO SILVER BULLET

BUT WE SURE HAVE SILVER BUCKSHOT

Sustainability is happening

Sustainability Pays

Studies That Prove the Business Case for Sustainability

A project by:

NATURAL CAPITALISM SOLUTIONS

May 2012

Sustainability pays

Companies in the Dow Jones sustainability Index outperform the general market

Goldman Sachs report July 2007: Companies that are leaders in environmental, social and governance (ESG) policies outperform competitors in stock performance—by an average of 25%.

72% of the companies on the DJSI outperformed industry peers

Harvard Business Review

"Sustainability isn't the burden on bottom lines that many executives believe it to be. It can lower your costs and increase your revenues. That's why sustainability should be a touchstone for all innovation.

In the future, only companies that make sustainability a goal will achieve competitive advantage. That means rethinking business models as well as products, technologies and processes."

Why Sustainability is Now the Key Driver of Innovation

Marks and Spencer

Commited to carbon neutrality

Doing this contributed £105 million to the business last year

Set itself to achieve 180 environmental, social and economic targets by 2015 as part of a goal to become the world's most sustainable retailer,
M&S has met 138 of these
a further 30 are "on plan".

Steve Howard CEO of IKEA

Tackling resource scarcity and climate change and providing a great quality of life for the 21st centuries many people is a challenge that can only be met by a combination of good public policy and business innovation and investment. This clean revolution is the next wave of industrial transformation that will spur economic growth and deliver the jobs of tomorrow.

IKEA

Committed to be 100% renewably powered by 2020

Who's responsible?

Business will lead

"Most companies...are looking toward a world where sustainability is becoming a mainstream, if not required, part of the business strategy."

–Boston Consulting Group

McKinsey Study

While most executives considered sustainability important to their future, only 30% said they actively sought opportunities to invest in sustainability and stated that **an educational gap was a major barrier.**

Each person must see himself as though the entire world were held in balance and any deed he may do could tip the scales

Maimonides

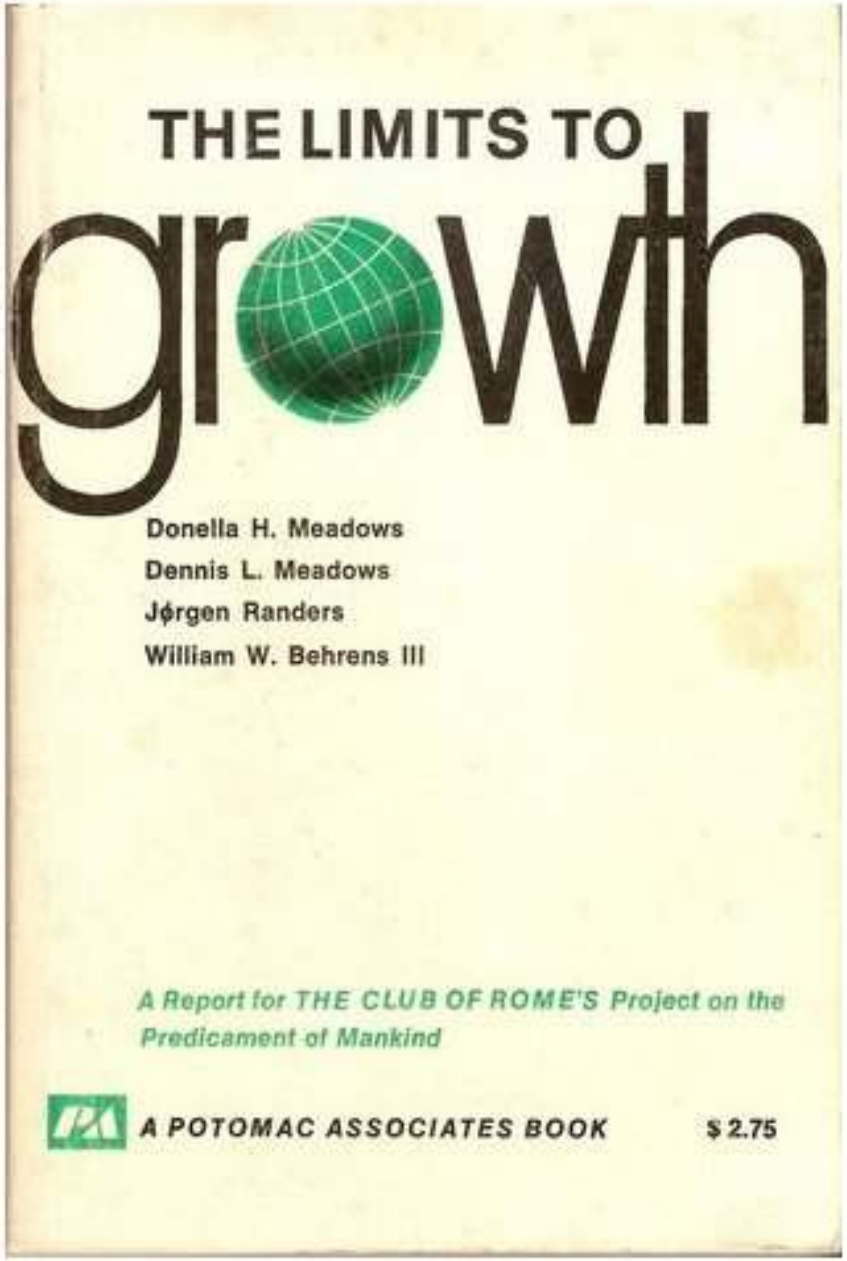
We are called to be architects of the future, not its victims.

Buckminster Fuller

Jamaican Renewable Energy Industry; Green Jobs All Over The Place

Natural Capitalism Solutions

Visit: www.natcapsolutions.org


THE LIMITS TO
growth
Donella H. Meadows
Dennis L. Meadows
Jørgen Randers
William W. Behrens III
A Report for THE CLUB OF ROME'S Project on the Predicament of Mankind
A POTOMAC ASSOCIATES BOOK
$ 2.75

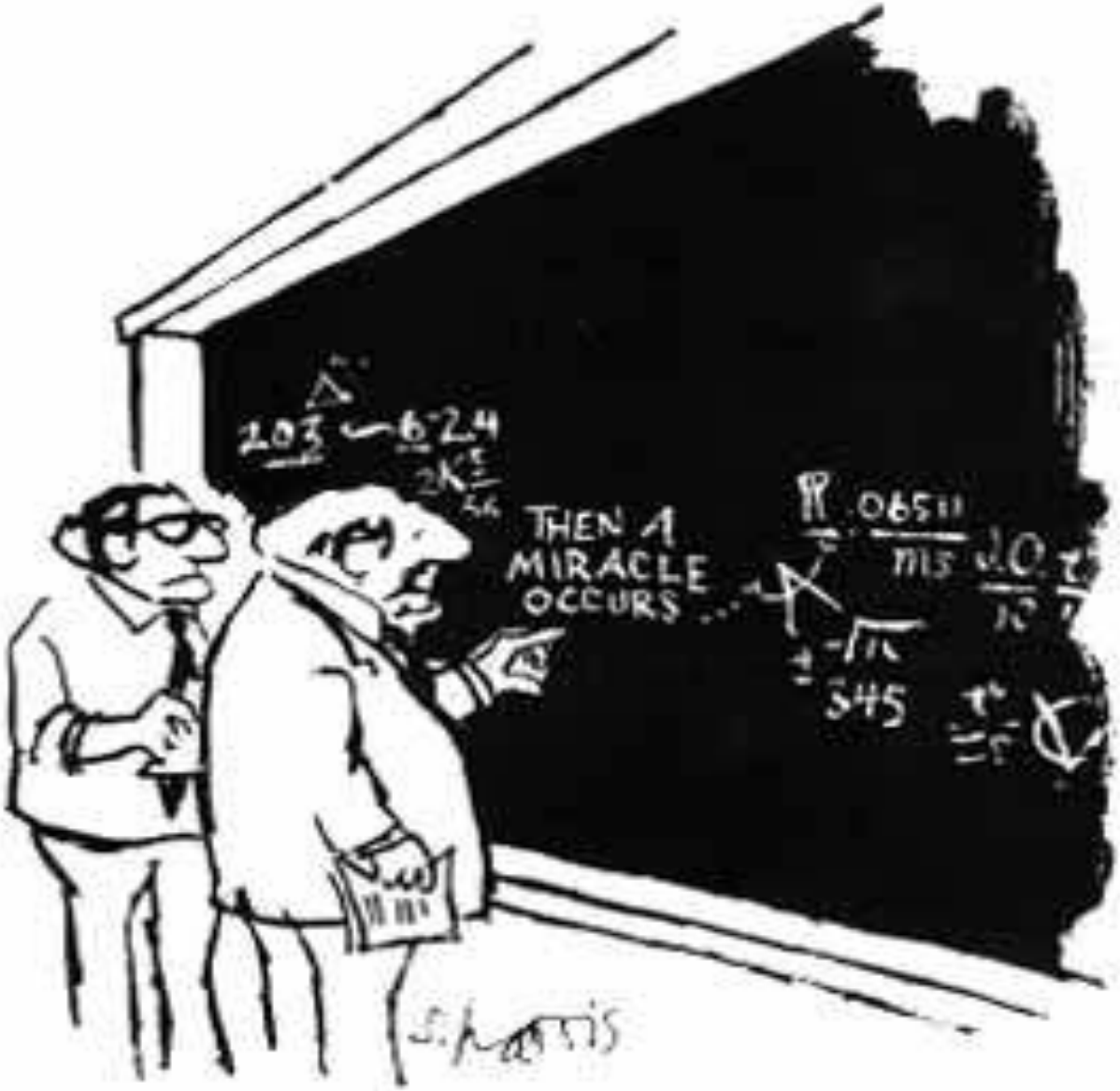
“New Limits to Growth Revive Malthusian Fears”

Wall Street Journal
March 24, 2008

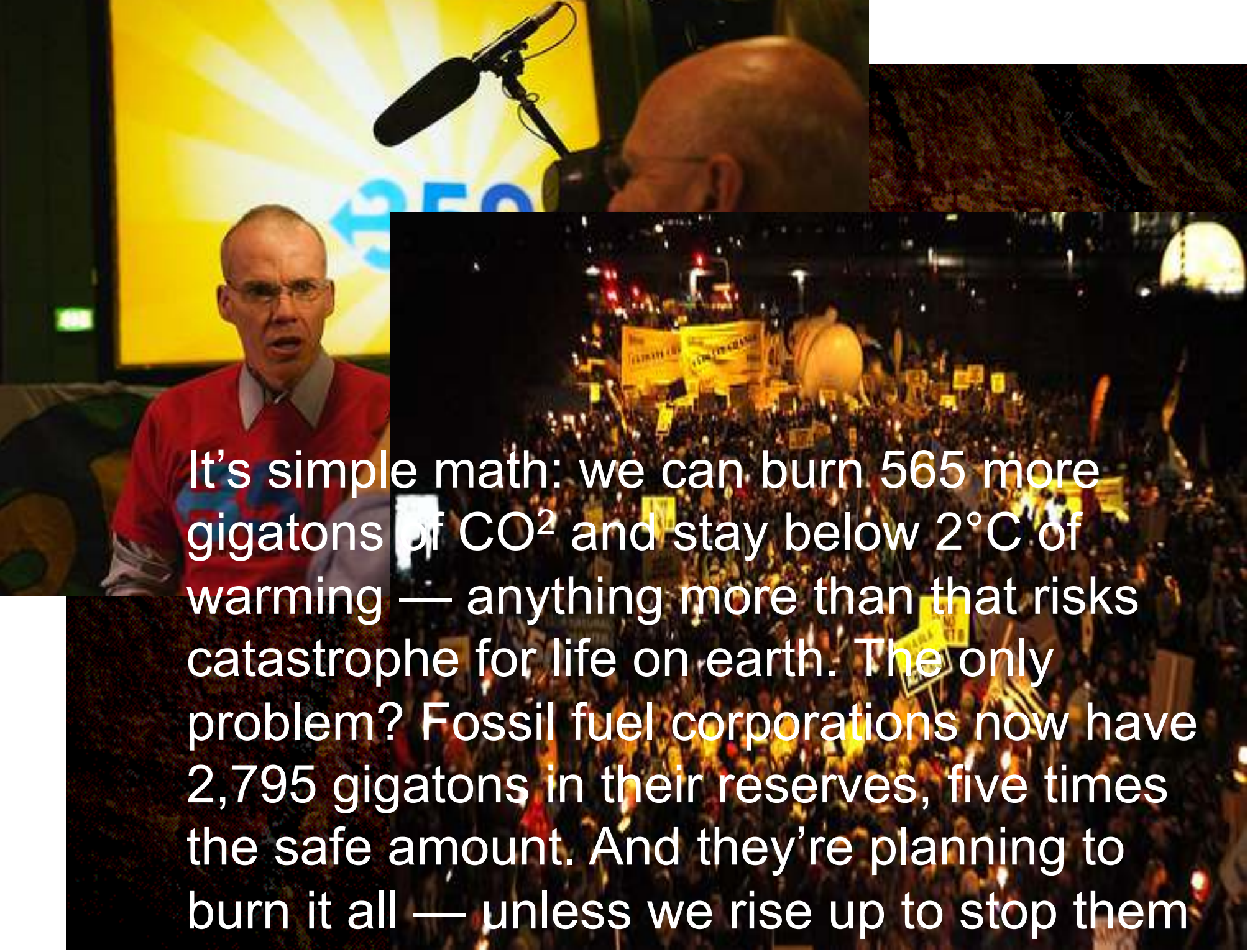
“Record highs in the prices for oil, wheat, copper…are signs of a lasting shift in demand unmatched by supply”

Challenge: Time frame

Normal penetration rates are way too slow

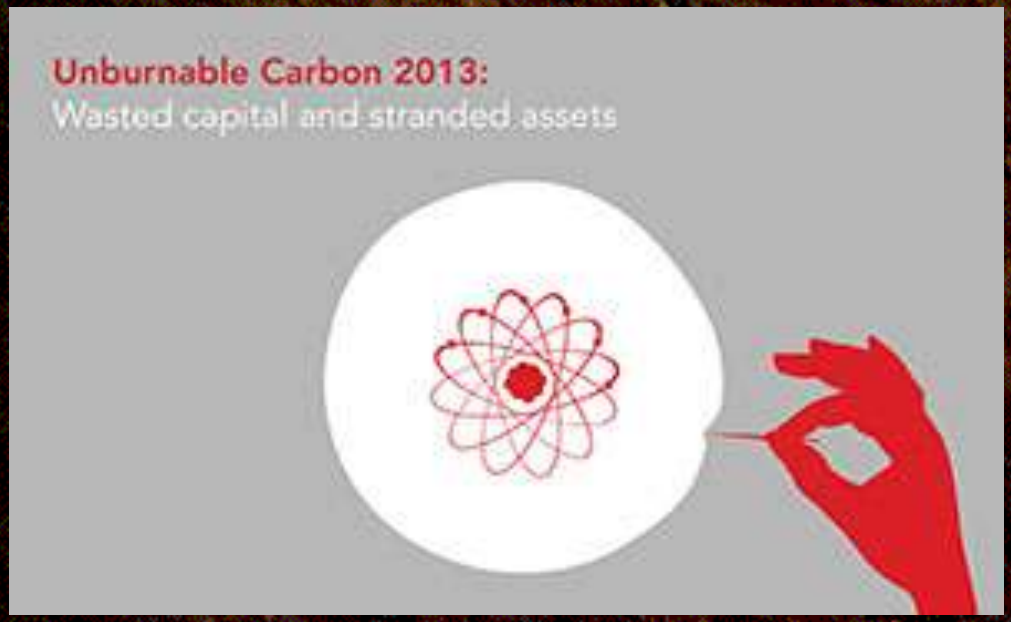


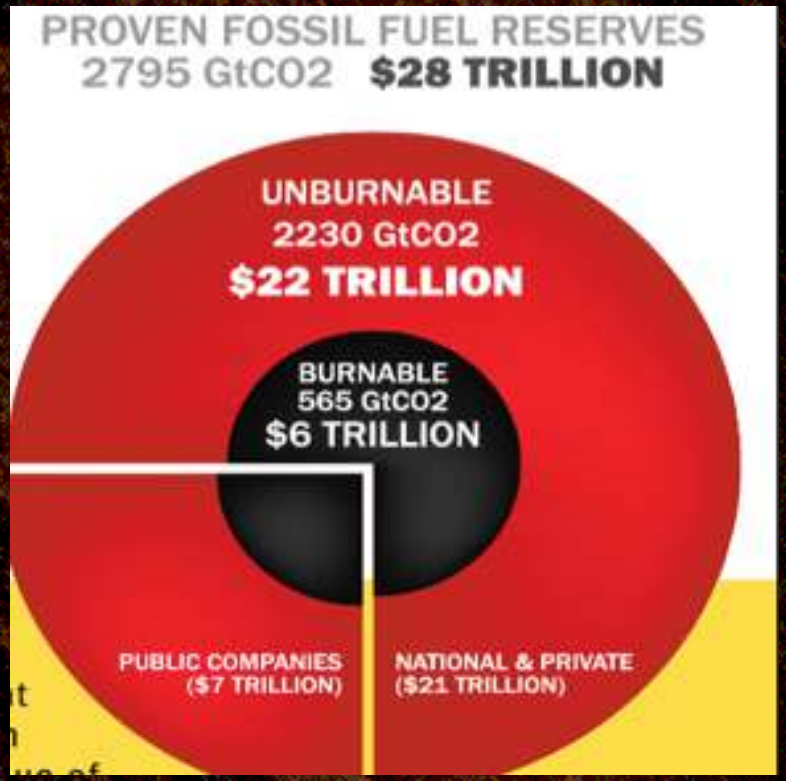
"I think you should be more explicit here in step two."



It’s simple math: we can burn 565 more gigatons of CO^2 and stay below 2°C of warming — anything more than that risks catastrophe for life on earth. The only problem? Fossil fuel corporations now have 2,795 gigatons in their reserves, five times the safe amount. And they’re planning to burn it all — unless we rise up to stop them

Carbon Bubble





"Wasted capital and stranded assets" concluded that between 60 to 80% of coal, oil & gas reserves of publicly listed companies are "unburnable" to keep within the 2°C limit.

Invest vs divest

Investors with $3 trillion are pressuring fossil companies to prepare for decline in demand and square their business model with carbon bubble

70 major investors led by CERES, Carbon Tracker ask 45 fossil firms to rethink investment in increasing supply to avoid stranded asset.

“Carry out risk assessment of the consequences of a global move to cut GHG by 80% by 2050”

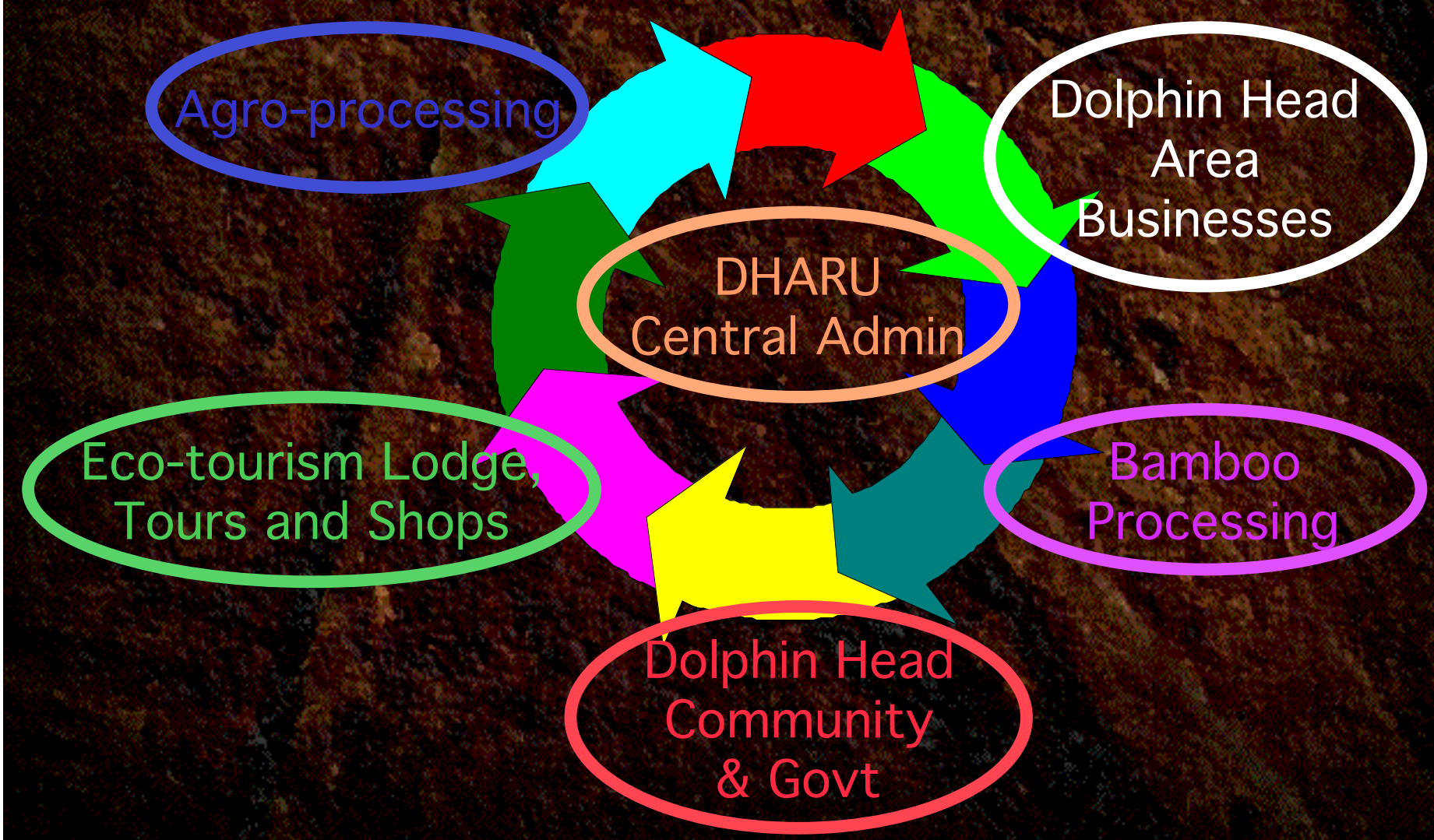
HSBC: in world where GHG constrained, fossil co’s lose 40 – 60% of market cap


Strategic Analysis
for
Dolphin Head Trust Project
Natural Capitalism Group
November 10, 2003

Lucea, Jamaica

Helping farmers convert from drugs to high value market crops

DHARU Business Plans: A Whole System Approach



Eco-Tourism

- The fastest growing form of tourism - the largest industry in the world
- Eco-tourists spend more per trip and per day than average tourists - up to twice as much
- 85% of tourists more likely to support travel companies that preserve the environment
- Energy efficiency and renewables can make all forms of tourism more profitable, and better for community

Ecotourism

Stanley Selengut's Maho Bay: a hybrid PV/wind system continues to provide reliable power, surviving both Hurricanes Hugo and Marilyn

Ecotourism: tell the story

Maho does not charge for rooms, it charges tuition. The guests learn where their food comes from, their energy, what the ecosystem is, and how to live within it. It links with the community to offer attractions, experience and learning

Eco-tourism

- DHT will use green materials, e.g. bamboo, to build structures that are energy and resource efficient. DHT will furnish the lodge with furniture, art, and crafts hand made from local materials by community members.
- DHT will engage locals in the design, construction, and maintenance of the eco-lodge. It will educate locals about the local flora and fauna and provide jobs, including nature tour guide and adventure trail guide, research, and land maintenance positions.
- Eco-tourism will focus on increasing visitors' appreciation of nature and local culture. It will have a strong educational and interpretive component.

Eco-tourism

- In Jamaica, the eco-tourism market is underdeveloped. There is a large opportunity for DHT to capture an international competitive advantage.

- DHT can differentiate itself from its competitors because of its geographic location. Its connection with the local community will enable it to offer a cultural experience, as well as nature tours that will educate and stimulate visitors.

Ecotourism: tell the story

Mockingbird Hill

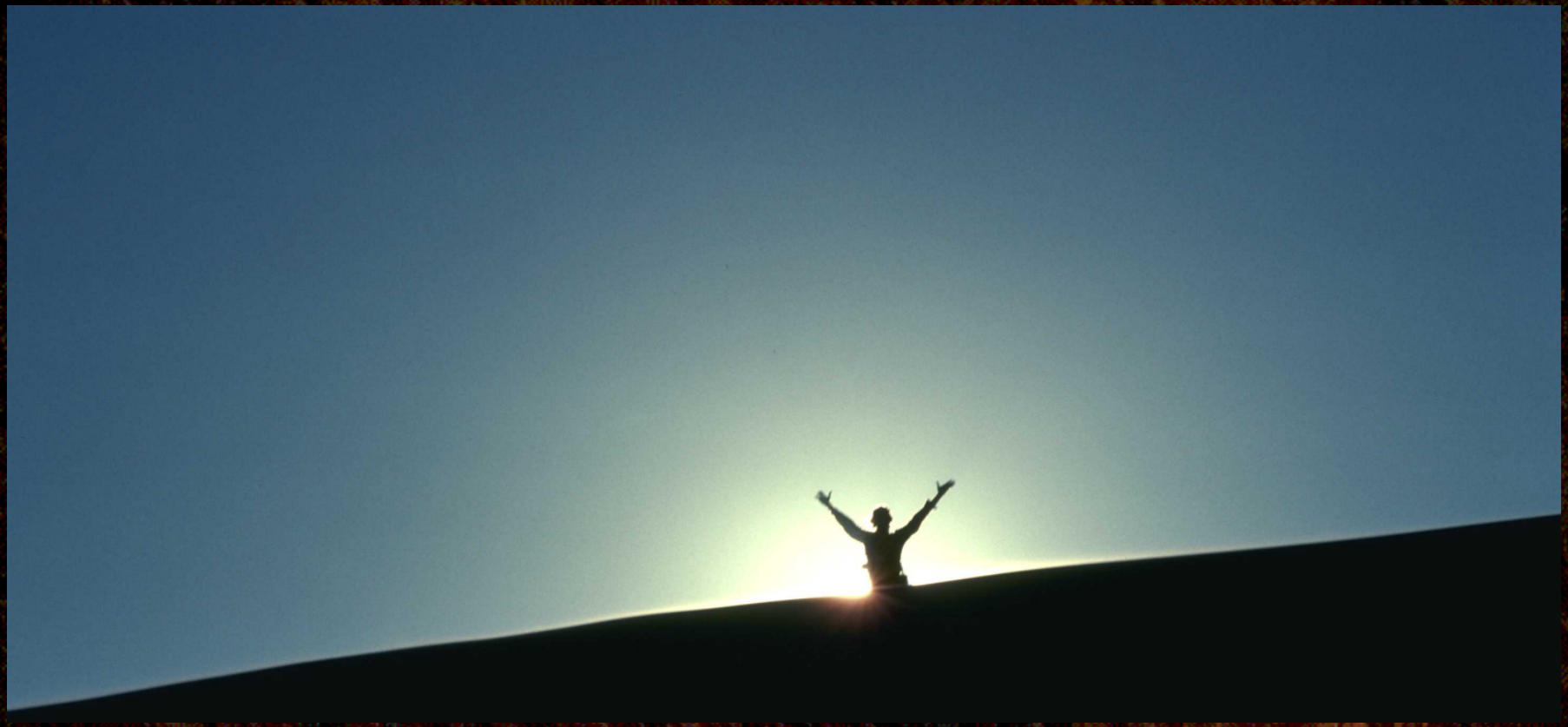
Eco-tourism

"Jamaica Naturally" the national OTF cluster group focuses on natural, adventurous, and exotic activities and accommodations.

A "pure-play" eco-lodge - high-quality (although not luxury) accommodations with a distinctively "natural" feel; organic food grown on the land; and an interactive, educational experience that enhances the guests' understanding of the Jamaican environment and culture.

Adventure Tourism

- People increasingly seeking authenticity
- Tours of Soweto one of the most popular tourist offerings in Johannesburg, South Africa
- Must have supporting actors, so that whole experience is positive one



You are selling experience

John Maynard Keynes

"I sympathize therefore, with those who would minimize rather than those who would maximize, economic entanglement between nations.

Ideas, knowledge, art, hospitality, travel-these are the things which should of their nature be international.

But let good be homespun whenever it is reasonably and conveniently possible; and, above all, let finance be primarily national."

Jamaica's 2010 Generation Mix				
Technology	Plant Type	Fuel Type	Total Capacity (MW)	% of total
Fossil Fuel Plants	Steam (power only)	HFO	292.0	95%
	Steam (CHP)	HFO	1.0	
	Diesel	HFO	224.4	
	Combined Cycle	ADO	114.0	
	Combustion Turbine	ADO	165.5	
Total Fossil			796.9	
Renewable	Hydro		22.3	5%
	Wind		20.7	
Total RET			43.0	
TOTAL			839.9	100%

Source: Office of Utilities Regulation Worldwatch Institute

My kids

Recipients of CA's GEELA award – highest environmental award

Refrigerant Lifecycle : Closed Loop