



BP and Climate Change

A Business Perspective

The Climate Challenge: Strategies for Montana's Future
September 23, 2006

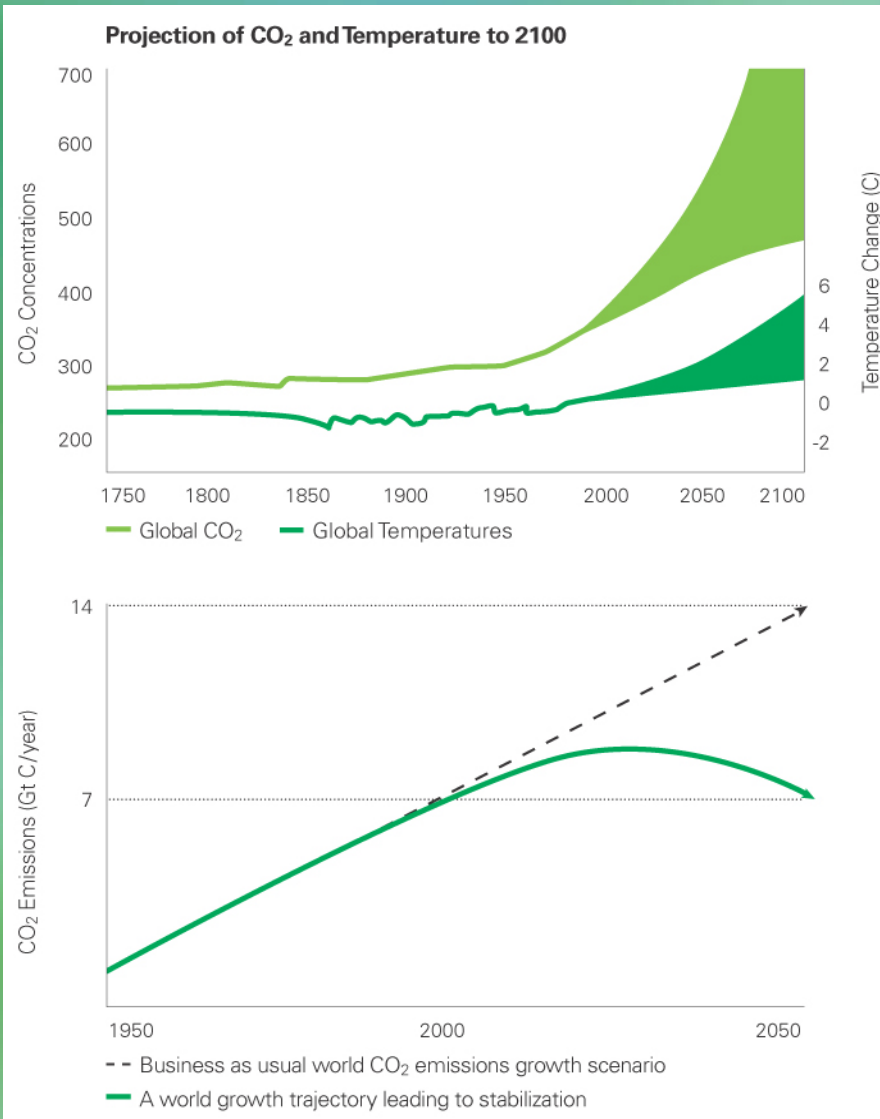
Bill Gerwing
Director Environmental Policy



Who is BP?

- Provider of energy in 100 countries through 100,000+ employees – 40,000 employees in the US
- Operate in most US States- about \$41B in fixed assets
- Approximately 40% of assets in the U.S.
- Largest producer of oil and natural gas in the U.S.
- 5 US refineries, 13,000 US service stations
- The combination of British Petroleum, Amoco, ARCO, Castrol
- About 1.3 million or 38% of BP's shareholders reside in the US

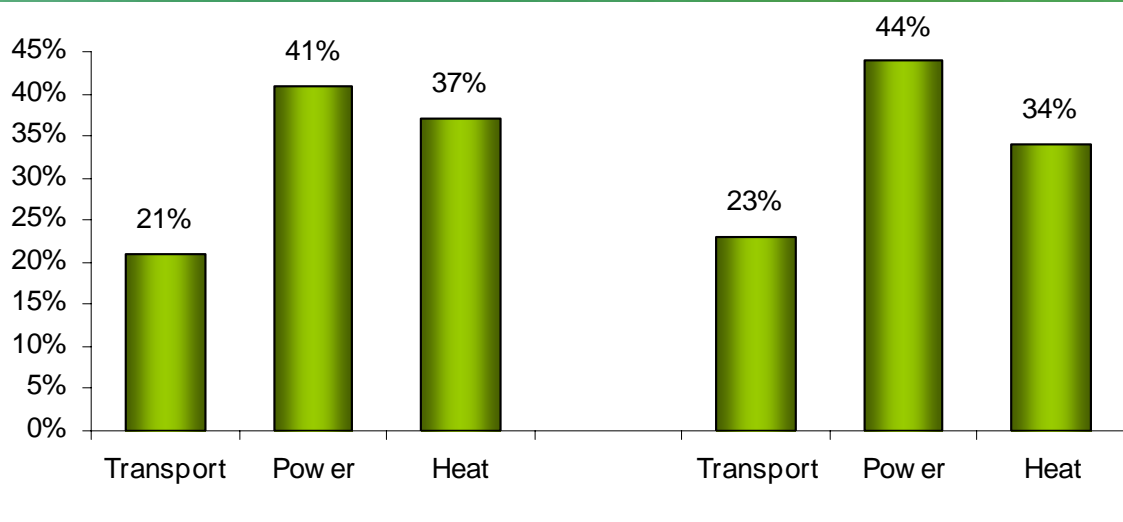
Global context



- In 2000, there were 675 million cars in the world – by 2020, there may be one billion
- Energy consumption is forecast to grow about 2 percent each year for next ten years, potentially doubling by 2050 unless concerted action is taken
- 1.6 billion people have no access to electricity. The challenge: how to stabilize greenhouse gases while providing society with the energy it needs
- Competitive advantages from:
 - reductions in energy intensity
 - development of lower carbon energy products and services
- Leadership requires combination of regulation, incentives and investments, based on open and deregulated markets

The emissions challenge

CO₂ Emissions By Sector



2004

2020

Base Case

Overall Capacity

- Power capacity up 48% to 5800GW

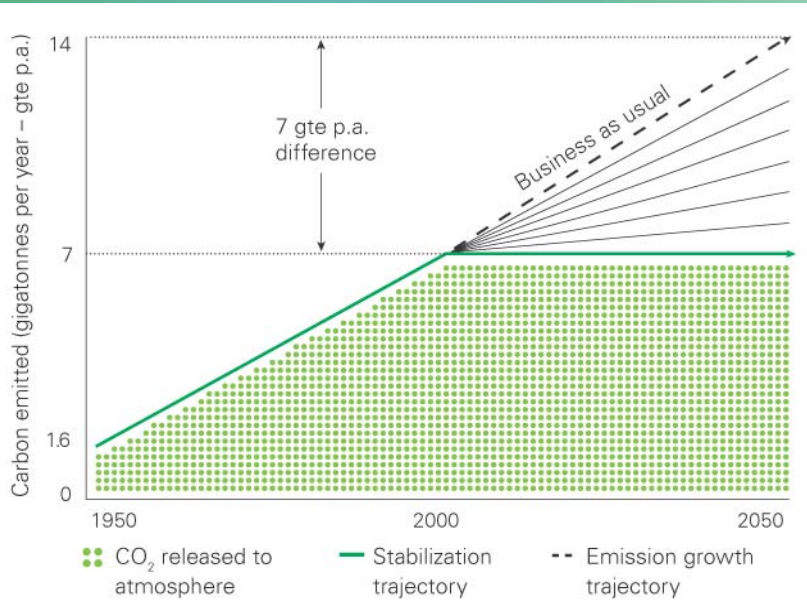
Fossil Fuels

- Gas increases 87%
- Coal increases 43%
- Oil increases 12%

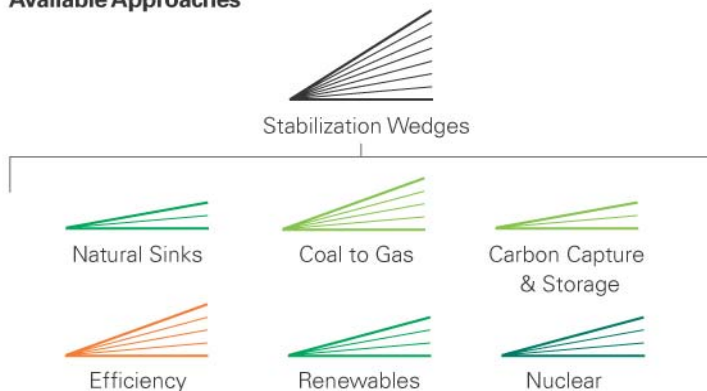
Low-Carbon

- Nuclear stays flat
- Hydro increases 29%
- Renewables increase 234%

Stabilizing global emissions



Available Approaches



- We need a way of translating multiple scenarios into a framework for focused action
 - Consider a 50 year timeframe where energy consumption will roughly double
 - Carbon emissions today are ~7G Tonnes
 - On a BAU basis – emissions will be ~14 GT by 2050

- We have a simple model that illustrates a series of actions ('wedges') that could each reduce annual emissions by 1 billion tonnes of carbon by 2050

Examples of 1 GtC Wedges



Wind energy

2 million 1-MW windmills
Today: 40,000

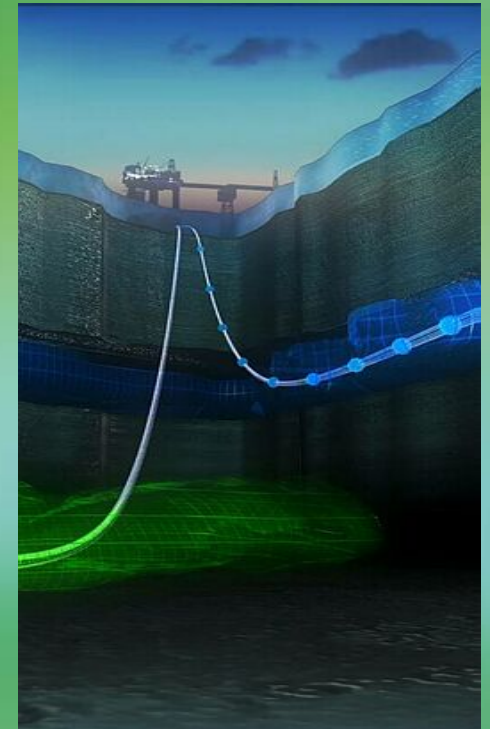


Fuel switching

Replace 1400 coal
electric plants
with natural gas-
powered facilities

Carbon storage

1000 CCS (Carbon Capture and Storage)
Projects



BP Positions on Climate Change

- There is no single solution
- We support early action
- Both governments and business have a role in leading society's response to climate change
- We acknowledge that our products and operations contribute to climate change
- We believe there are a range of options that, with concerted action, could shift the future course of emissions growth
- We believe that business planning should be based on stabilizing greenhouse gas concentrations in atmosphere to limit world temperature rise to around 2 °C (500 to 550 ppm)
- We support market mechanisms, such as EU emissions trading scheme, as a low-cost method to reduce greenhouse gases

BP's Response

- Leadership on the issue
- Getting our own operations in shape
- Developing a suite of low carbon technologies
- Informing the policy debate

BP Alternative Energy

Power generation with lower emissions



Hydrogen power



Wind power



Solar power



Gas Generation

Targets

- To become a world leader in low-carbon energy
- An Investment plan of \$8 Billion over 10 years
- An annual operating profit of up to \$1 billion within next decade
- Plan to cut projected GHG emissions by 24 million tones a year by 2015



BP Alternative Energy

Our new business: Alternative Energy was announced in late 2005.

In the next 3 years we will:

- Grow BP's wind business from 30 MW to more than 450 MW
- Commence construction of the world's first commercial hydrogen power and carbon sequestration projects
 - One in Scotland (2007), the other in Los Angeles (2008)
- Develop over 700 MW of new installed natural gas-fired and cogeneration capacity
- Increase sales of solar photovoltaic (PV) panels by at least three times

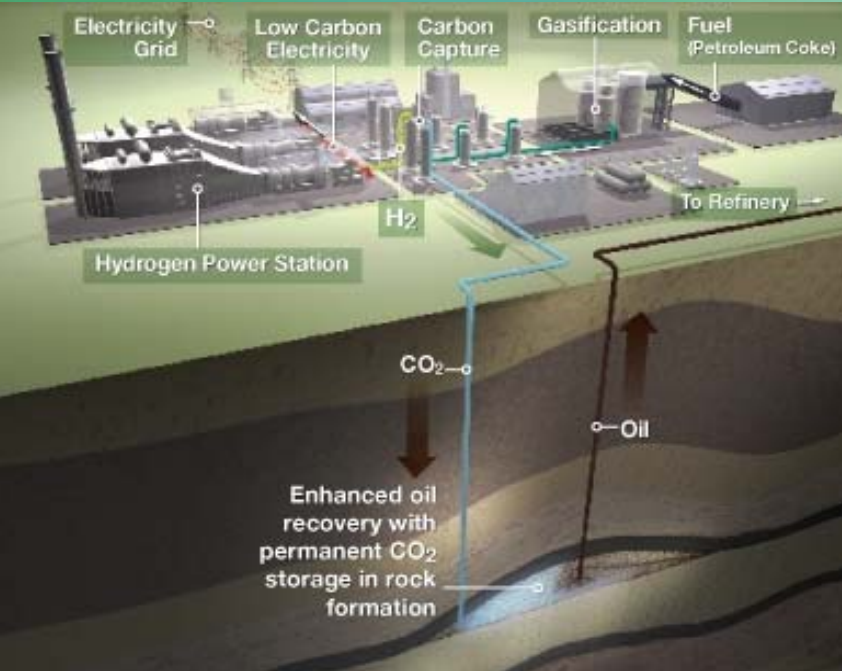
Our longer-term goals:

- To become the world's leading low-carbon power business
- Deliver annual revenue of up to \$6.5 billion by 2015 while cutting projected emissions by 24 million tonnes per year

Why Power, Why Now?

- By 2020 the world will be using 50% more power
- Nearly half the power plants for use in 2020 are yet to be built
- Cleaner technologies options need to be available to those making these long-term capital decisions
- Some of these technologies are economic now and are becoming increasingly competitive
- The low carbon market could reach \$600bn by 2020

Carson Hydrogen Power Project



- \$1 billion de-carbonised, 500 MW electrical plant in Carson, CA.
- Petroleum coke will be converted to hydrogen and CO₂
 - Hydrogen will be used for power generation
 - CO₂ will be transported to nearby oilfield for enhanced oil recovery
- 4 million tons/yr. of CO₂ captured and stored
- In feasibility stage; sanction in 2008; start-up in 2011

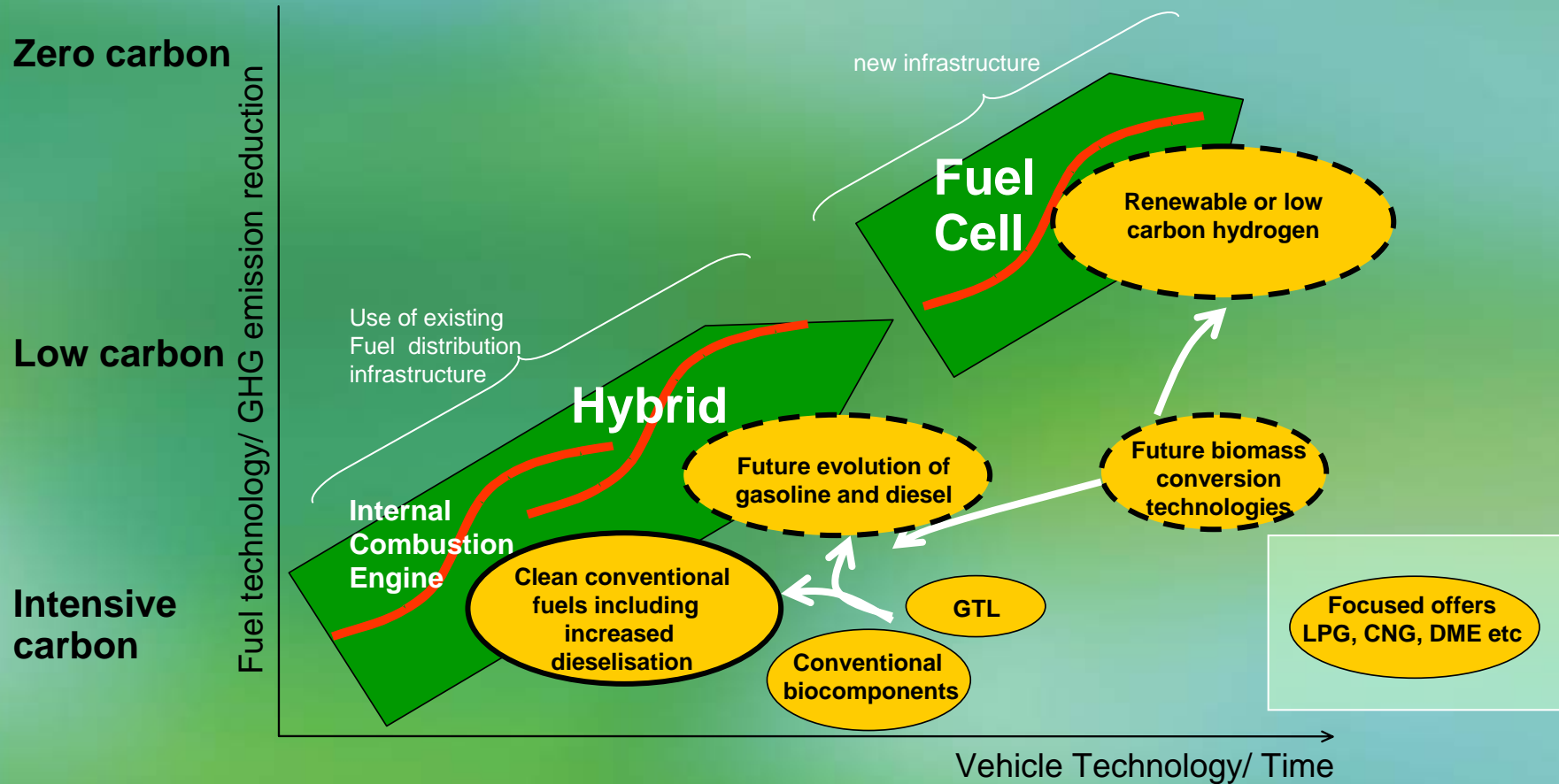
BP and Biofuels



- One of the largest marketers of biofuels in the U.S. – 575 M gallons last year
- Formed a new Biofuels business in June
- Announced plans to invest \$500 M in new Energy Biosciences Institute to provide a pipeline of biofuels technology for the business
- Will partner with science company DuPont to develop advanced biofuels-the first introduction is biobutanol.
- BP & DuPont collaborating with British Sugar to convert an ethanol fermentation facility to produce biobutanol

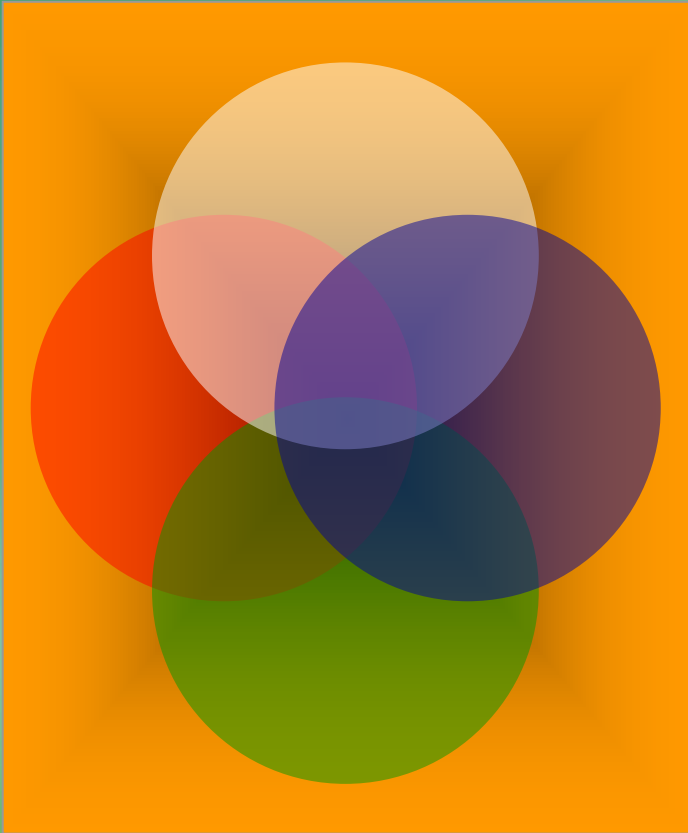


BP strategy: The future fuels pathway



Biofuels are a critical and timely step in the future fuels pathway and will help deliver goals towards security of supply and GHG emission reduction

What is needed?



- Fuels that can be produced from domestic, renewable resources in high volume and at reasonable cost.
- Fuels that can be used in existing vehicles and existing infrastructure
- Fuels that offer good value to consumers (price and energy content)
- Fuels that meet the evolving demands of **vehicles**

“Conventional” bio-components



Ethanol for
gasoline

sugar & starch crops



Biodiesel
(FAME)

oil crops

- Conventional biofuels are a positive first step in use of biomass
- GHG reductions
- Benefit rural economy
- Limitations :
 - Competing land use issues – food vs fuel
 - Not ideal fuel molecules: material compatibility; handling/quality issues, energy content
- Ethanol issues:
 - Significant additional infrastructure costs due to Water Solubility
 - Success at scale requires ‘whole of market’ introduction



Next generation Biofuels

- Advanced bio-fuels respond to all drivers - deliver on GHG, security of supply & support agriculture sector
- Biobutanol has a number of attractive properties:
 - Easily blended into gasoline
 - Can use existing fuel infrastructure without major modification
 - Potential to be used at higher blend concentrations than ethanol in unmodified vehicles
 - An energy content closer to that of gasoline than ethanol – reducing the impact on fuel economy for the consumer
- Biobutanol is complementary to ethanol:
 - Can be used together with ethanol
 - It can enhance the performance of ethanol blends in gasoline
 - It can be produced from the same feeds as ethanol
- Other Advanced biofuels will be explored through Biomass gasification and lignocellulosics



BP's View on Climate Legislation Design



- Federal, mandatory, economy-wide system
- Market-based system
- An emission cap w/ trading for large stationary sources
- Downstream point of regulation
- Specific policy for transport sector and buildings
- Technology policy
 - Reward prudent risk taking
 - Reward early movers
 - Encourage deployment and diffusion

Conclusion

- The demand for oil and gas will continue to increase
- Renewables currently play a very small role, but must play a larger role in the future
- Climate change is a significant challenge – it is solvable, but not easy to solve.
- Discussion taking place in earnest
- No silver bullet, no single piece of legislation
- Parallel policies
- Consumer engagement necessary