The United States Energy Challenge
...exploring the alternatives

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BP in America

- Largest investor in US energy - $52 billion over the last five years
- 23,000 US employees, and support over 210,000 more
- BP invests more in the US than any country we operate
- Alternative energy - $7 billion invested since 2005, mostly wind and biofuels

Students, listen up…

- The average salary and benefits of a BP employee is more than twice the national average across all occupations
- In 2011, BP hired more than 3,000 full-time employees in the U.S.
Non-OECD economies drive energy consumption growth…

Energy Outlook 2030
World primary energy consumption is projected to grow by 39% over the period 2010 to 2030.

Almost all (96%) of the growth is in non-OECD countries.

OECD energy consumption in 2030 is just 4% higher than in 2010.

The fuel mix changes slowly, due to long gestation periods and asset lifetimes. Gas and non-fossil fuels gain share at the expense of coal and oil. The fastest growing fuels are renewables (including biofuels) which are expected to grow at 8.2% p.a. 2010-30; among fossil fuels, gas grows the fastest (2.1% p.a.), oil the slowest (0.7% p.a.).
Energy can be available and affordable

- Competition
- Innovation
- Regulation harnessing market forces

Energy security will remain an issue

CO₂ emissions not on track

Conclusion – Global Outlook

GDP, Energy and CO₂

Index (1970=100)

1970 1990 2010 2030

GDP
Energy
CO₂

Energy Outlook 2030
The US Energy Picture by 2030

- Overall US energy consumption falls slightly (-2%) 
- US energy production rises by 19% 
- US energy production as a share of consumption rises from 77% in 2010 to 94% by 2030 
- Large declines in US oil (-24%) and coal (-22%) consumption offset by growth in natural gas (13%) and renewables (263%, esp wind and biofuels) 
- US net oil imports fall by more than half 
- US share of global energy consumption falls from 19% to 13% 
- Oil’s share of the transport sector falls from 95% to 83% (virtually all met by biofuels) 
- Renewables share of US energy rises from 3% to 10% 
- Fossil fuels account for 78% of US energy demand, down from 86% 
- Carbon policy is a driver of efficiency and emission reductions 
- CO2 emissions fall 
- Hard choices in energy policy remain
Natural Gas Becoming a Game Changer

- Technological breakthroughs dramatically increase domestic supply and lowers price
- US natural gas production rises 30% by 2030
- The US becomes self sufficient in natural gas
- The US remains the largest producer of natural gas in the world
- Natural gas replaces oil by 2030 as the leading fuel in US energy consumption
- Large cost advantage to Europe
- Fuel switching reducing GHG emissions
- Manufacturing renaissance?
Vehicle numbers are set to grow rapidly in the Non-OECD…

Total number of vehicles

Millions


Non-OECD

OECD

Vehicles per thousand people (1970-2030)

Vehicles

US

Germany

Japan

China

India

Energy Outlook 2030
Transport fuel demand is met predominantly by oil…

By energy type

Projected car efficiency

Billion toe

Litres per 100 km

Energy Outlook 2030
We can see four technology paths impacting the cost and CO2 reductions for transport…

First, vehicle efficiency can be increased through more efficient engines…

- Conventional Gasoline: e.g. Ford Focus 1.6 Duratec (C); Mercedes Benz C230 (D)
- Conventional Diesel: e.g. Renault Megane 1.9 dCi, VW Passat 2L
- Conventional Gasoline - Increased Efficiency: e.g. Toyota Auris 2009 T2; Mercedes Benz B150 (Blue Efficiency)
- Diesel - Increased Efficiency: e.g. VW Golf 1.6 (Blue Motion); Peugeot 407 Saloon 1.6

The graph shows the relationship between purchase cost above conventional gasoline option (in Euros) and WTW CO2 (grams per km). Based on a medium size car example, BEV battery costs assumed at €300/kWh.
We can see four technology paths impacting the cost and CO2 reductions for transport...

And further efficiency is available through hybridisation.
Very low emissions can be achieved…

Through battery electric vehicles recharged with renewable, CCS or nuclear power.
Policy and technology enable efficiency improvements...

Passenger car sales by type

Global vehicle fleet in 2030

- Plug-ins incl. BEVs: 4%
- Full hybrid: 11%
- Mild hybrid: 16%
- Conventional incl. stop-start: 69%

Energy Outlook 2030
Efficiency gains have the biggest impact on oil demand…

Oil demand in road transport

2010 | Increased number of vehicles | Reduced average usage | Improved vehicle efficiency | Increased use of alternatives | 2030

- Non-OECD
- OECD
- Biofuels
- Other*

* Includes GTL, CTL, CNG, LNG and electricity
In conclusion in the transportation sector…

- Vehicle count grows rapidly – on a global scale

- Oil will remain the dominant energy source in the transport sector for decades to come

- Much more efficient vehicles and hybridization significantly reduce fuel demand

- Advanced biofuels reduce carbon emissions and displace oil in transport

- Other fuels, such as electricity may begin to grow post 2030 – but face significant hurdles – such as battery, vehicle costs

- Demand management must play a role
For more information…

www.bp.com/energyoutlook