- Energy Situation in the World-

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Energy Demand

World Primary Energy Demand

	World Primary Energy Demand (Mtoe)				
	1980	2000	2005	2015	2030
Total	7,223	10,034	11,429	14,121	17,014
Oil	3,107	3,649	4,000	4,525	5,109
Transport	1,245	1,936	2,011	2,637	3,171
Oil	1,187	1,844	1,895	2,450	2,915
Biofuels	2	10	19	74	118
Other fuels	57	82	96	113	137

(Source) IEA World Energy Outlook 2007, 2008

- Energy demand increased 58% in 25 years from 7,223 Mtoe in 1980 to 11,429 Mtoe in 2005
- Energy demand will increase 48% in 25 yrs from 11,429 Mtoe in 2005 to 17,014 in 2030 (Oil demand will increase from 4,000 Mtoe in 2005 to 5,109 Mtoe in 2030)
- World need new oil production of 64 million b/d from 2007 to 2030 which six times bigger than present Saudi Arabian production. (82% of world resources in OPEC and Russia)
- Energy demand in transport sector will increase 57% from 2,011Mtoe in 2005 to 3,171 Mtoe in 2030. More than 90% of transport fuel is from petroleum oil.
- Alternative fuel need compatibility with petroleum fuel due to Infrastructure (SS,Tank, P/L), Automotive, Airplanes. Biofuels, which can be blended up to some points to petroleum fuel, have some advantage as an alternative fuel for petroleum fuel.

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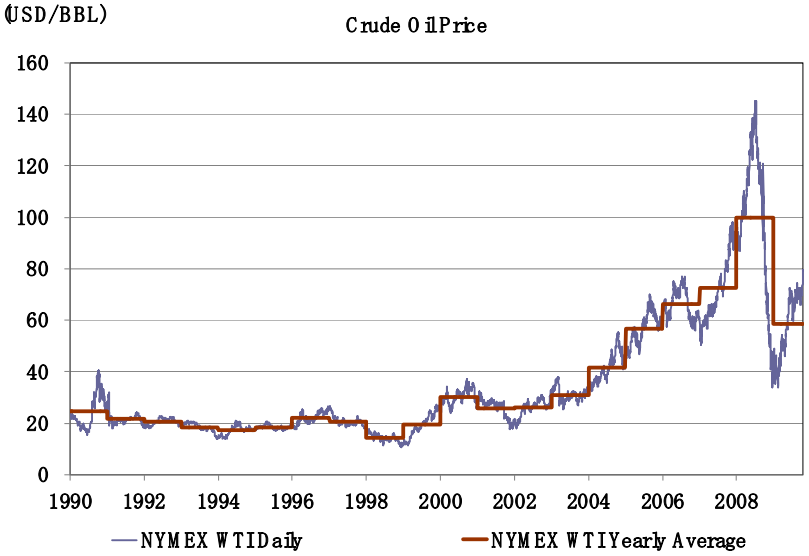
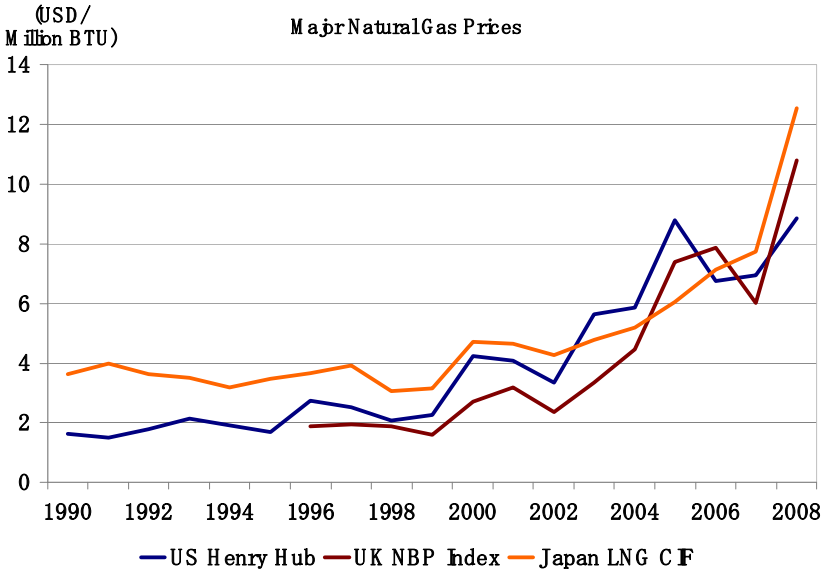
Energy Prices

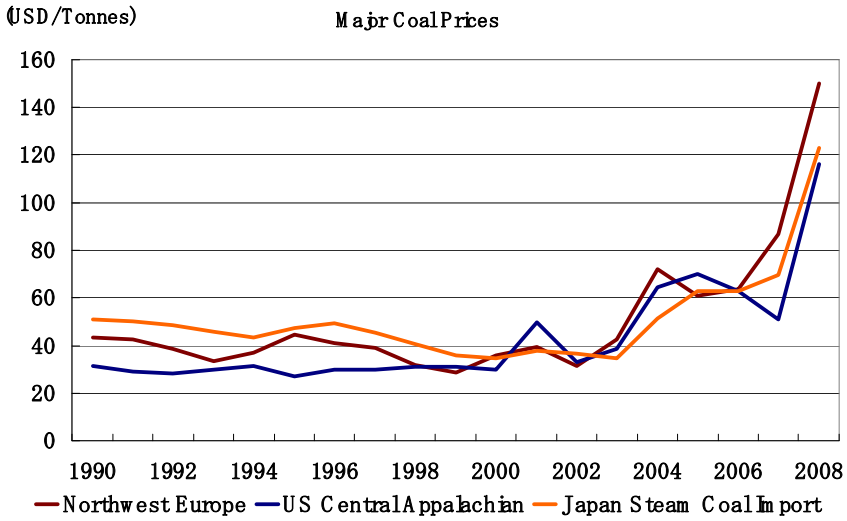


(source) US, Energy Information Administration



(source) BP Statistics

- Various reasons are pointed out for the oil price surge in 2000s including
  - Demand surge in newly emerging countries
  - Geopolitical reason & "resource nationalism"
  - Speculative investors
  - Inflation in USD etc
- Natural Gas and Coal have similar trends in long term.
- After the time of crude price of about 10-30 USD/BBL has gone, significance of alternative fuel is increased more than 1990s.



(source) BP Statistics

Global Climate Change

- Environmental issue, specially global warming issue have been given much attention.
  - 1994 : United Nations Framework Convention on Climate Change / UNFCCC
  - 2005 : Kyoto Protocol to the United Nations Framework Convention on Climate Change (Reduction of Green House Gas in developed countries from 2008 to 2012)
  - Biomass energy including biofuels is recognized as “Carbon Neutral” because CO2 is absorbed during their growth process of plants

    (biofuels is important because they not only increase diversification of energy supply sources but also neutral in CO2 emmission under current point of view)
  - 2007 : In "IPCC Fourth Assessment Report: Climate Change 2007“, global climate will increase 1.1～6.4℃ at the end of 21th century
  - 2009 : Framework after 2012 are tried to be agreed at COP15 in Copenhagen
- Effort for Low Carbon Society will be more increased after 2012. Renewable Energy including Biomass become more important as one of the major primary energy source

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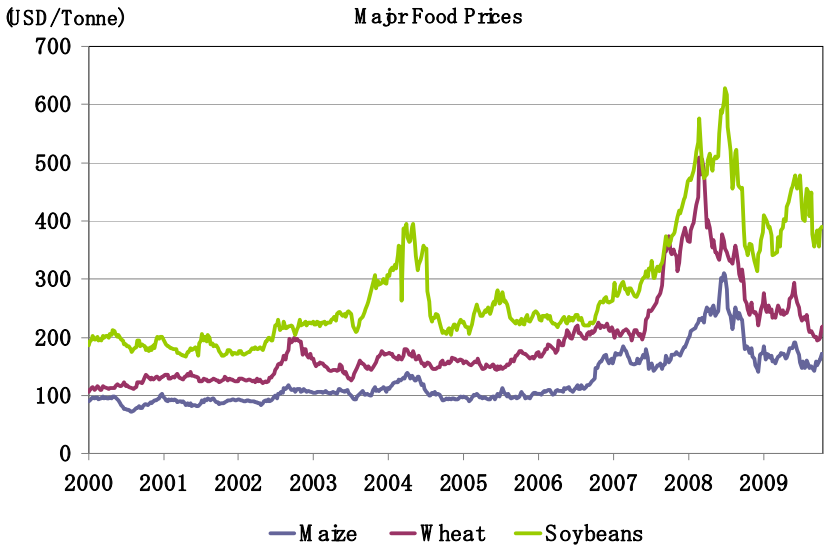
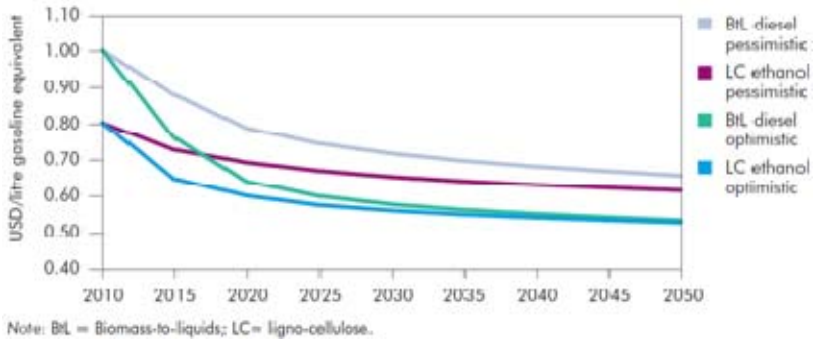
Biofuels



（source）Food and Agriculture Organization

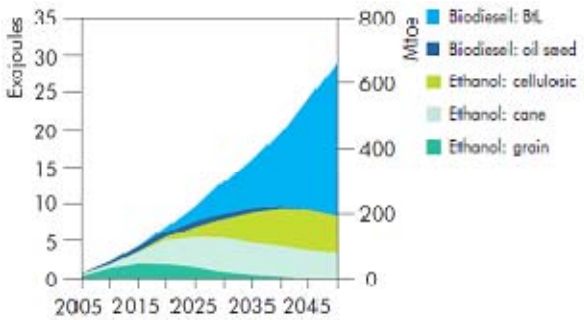
- "Food vs Fuel" issue in 2008
- New movement in Biofuel Sustainability Standard / Criteria
- Commercialization of next generation biofuels (Cellulosic ethanol etc) in 2010s is expected more than ever.

Cost Forecast of Next generation Biofuels



(Source) IEA " Energy Technology Perspective 2008"

Biofuel Introduction in BLUE Senario



(Source) IEA " Energy Technology Perspective 2008"

Thank you!

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