

Bioenergy on the International Agenda

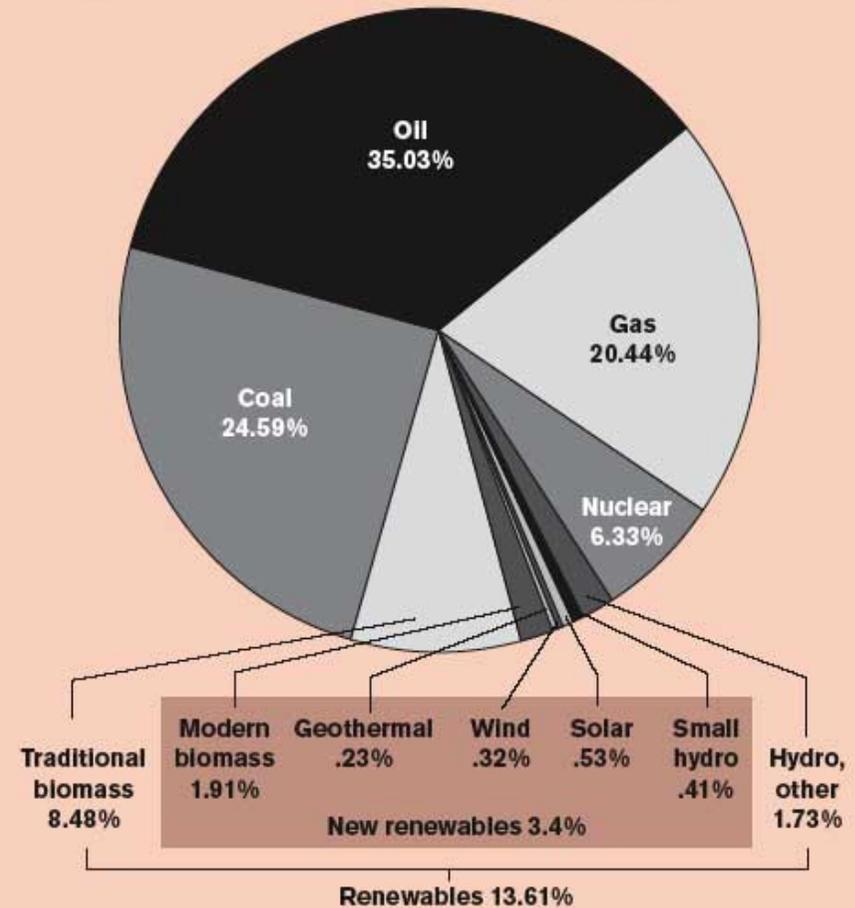
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Biofuels: More Talk than Reality?

- Attention to Biofuels Stems from
 - Interest in Energy Security
 - Diversification of Energy Supply
 - Prospect of Local Production
 - Reversal of Agricultural Price Trends
 - Greenhouse Gas Reductions

Biofuels are a small component of a much larger Bioenergy/ biomass contribution to total primary energy supply.

Figure 1. World total primary energy supply 2004



NOTE: Shares are out of 2004 total 11.2 billion tons of oil equivalent, or 470 exajoules (joules 10^{18}).

SOURCE: J. Goldemberg, "Ethanol for a Sustainable Energy Future," *Science* 315, no. 5813 (9 February 2007): 808–10).

Perceived Problems

- Biofuels accelerate deforestation
- Biofuel feedstock production displaces food production
- Biofuel demand is responsible for the “food price crisis”
- Biofuel production contributes to land and water degradation.

Much the same could be said about other nonfood crops.

Starting in the Middle

- Biofuels are the only near term alternative to petroleum for transport sector
- Blends with other liquid fuels; compatible with fuel distribution infrastructure
- Rapid oil price rise since 2003 accelerated interest in liquid biofuels
- Dependency on OPEC fed public policy debates
- Brazil's success in making ethanol a part of overall energy supply proved attractive
- Efficiencies in ethanol and oilseed production relative to petroleum costs made a shift enticing
- Gasoline and diesel demand are the primary drivers of oil imports in both the US and Europe
- Opportunity to diversify supply with home-grown products added to political support

Can Mandates Create Markets?

- EU and US determined that blending mandates were the best way to stimulate production – this initiative helped European and US farmers – and created new demand.
- Globalization of markets – meant that if rapeseed and corn were used for biofuels; demand for substitute products increased.
- US and EU also protected their markets from imports; reducing efficiencies of demand and supply.

What we know about biofuels

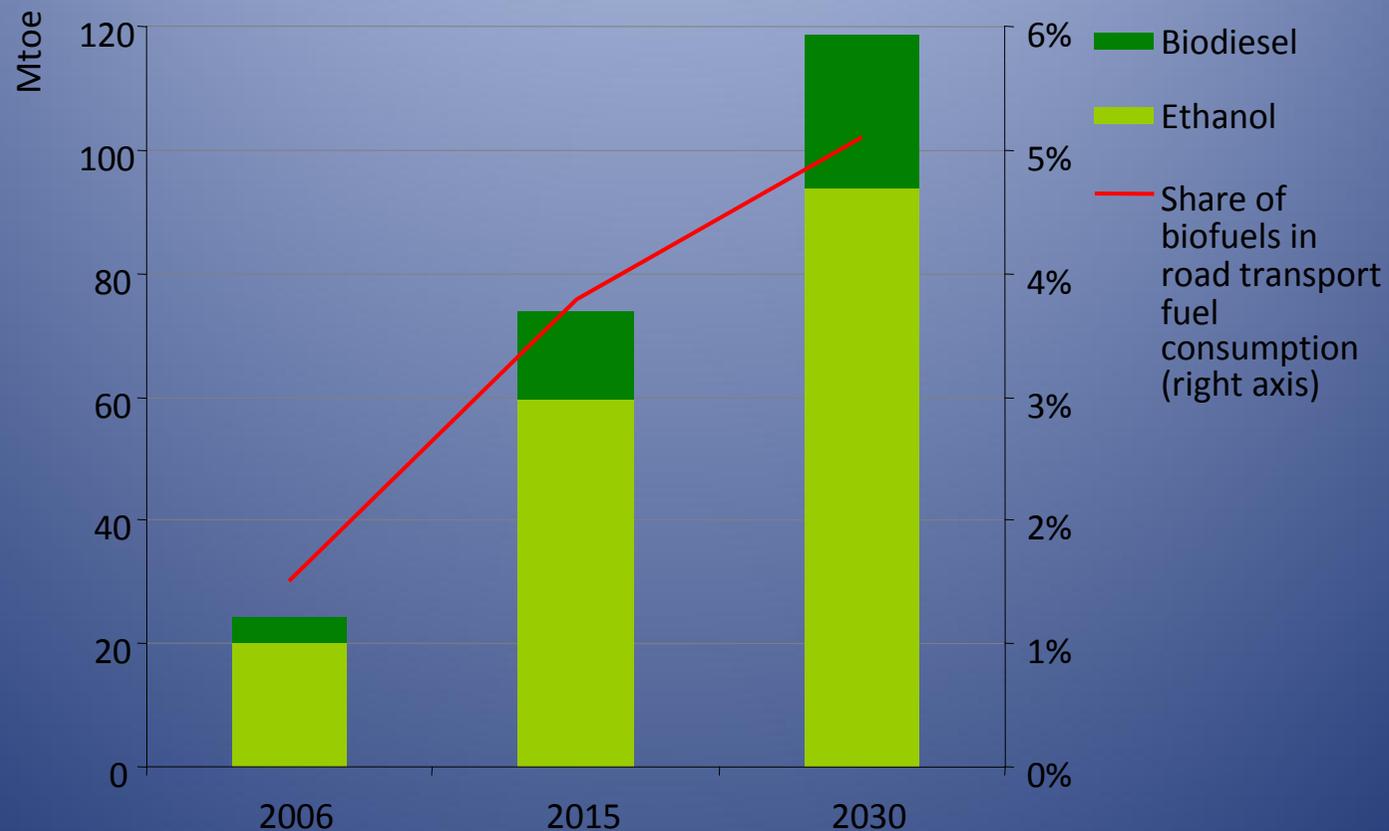
- To optimize energy availability, processing must be done at the point of harvest
- Transporting any volume of biomass is likely to add to costs
- Some forms of biofuels can only be commercially viable with new systems in place
- Vegoil is the product that can be most easily integrated into current trade

Reality of Biofuels

- Two biofuels dominate the current global market: ethanol and vegoil (mostly palm and rapeseed)
- Most biofuels are produced and used locally
- International trade is limited

Current Biofuels Consumption is Relatively Low

WEO Reference Scenario: World biofuels consumption (Source: WEO 2008)



Use of biofuels is projected to climb from about 0.6 mb/d in 2006 to 3.2 mb/d in 2030 – equal to about 5% of total road-transport fuel demand

The Promise and the Hype

Competing with petroleum-based fuel is a challenge given its unique

- Energy density
- Portability

Veg oils have similar energy density, but producing them in the volumes required demands either more land or higher yields per hectare.

Sugarcane ethanol provides a good option for gasoline, and efficient producers (e.g. Brazil) can compete with oil at \$30/bbl.

Corn is a much less efficient option, but still provides some gains vis-à-vis a petroleum-based fuel.

Though For Developing Countries, Obstacles Exist

- Food Constraints
- Water Access
- Land use and Land Ownership
- Vulnerability of Agricultural Markets
- Goals and Scale of Production
- Governance

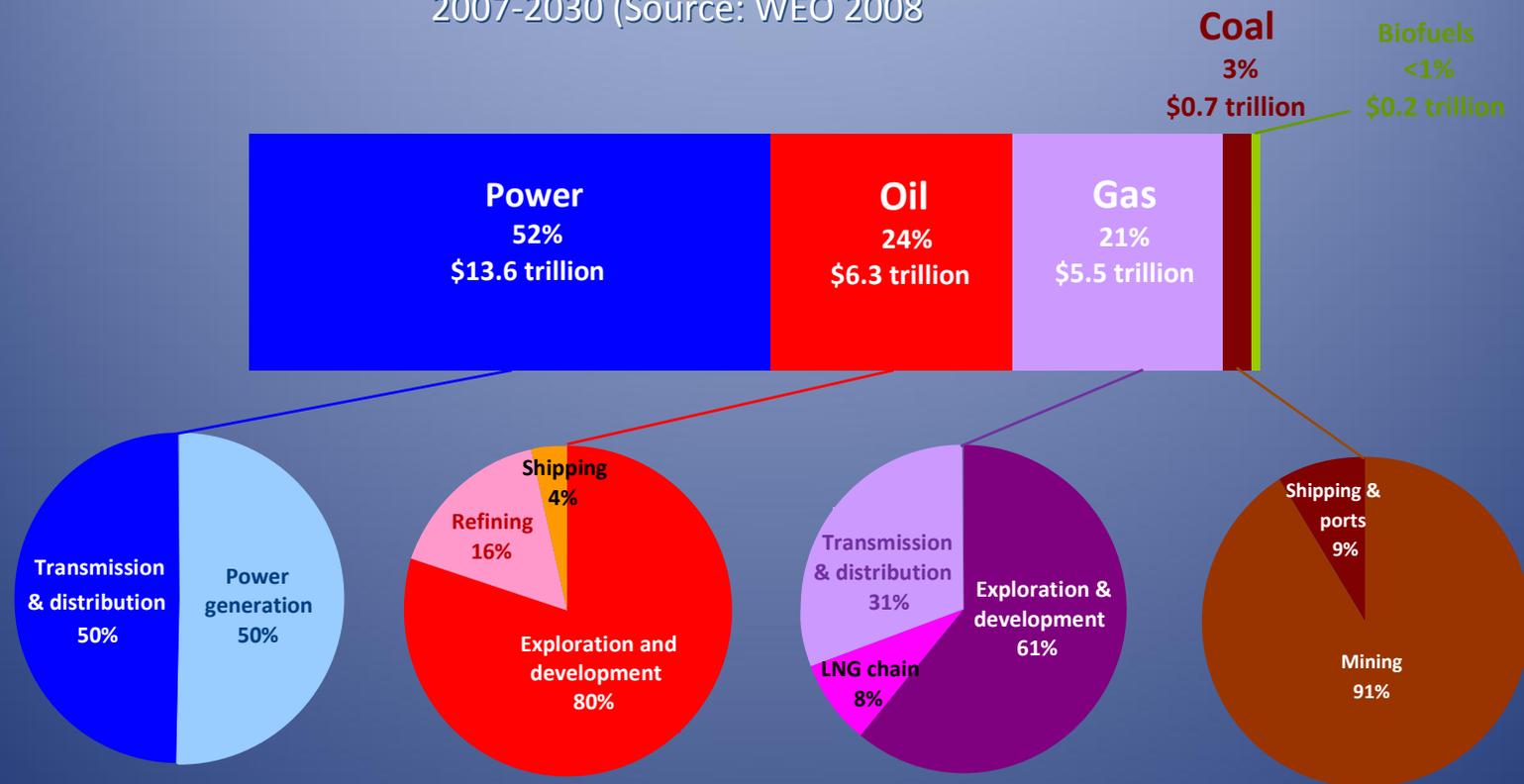
*So Do Opportunities—
A number of developing countries are exploring biofuels*

Rethinking the Paradigm

- Promise of biofuels is one of second generation feedstocks.
- Goal should be to use crop-based fuels in the most efficient way.
- Using food crops for fuel will increase food prices and impact land use without significantly increasing productivity.

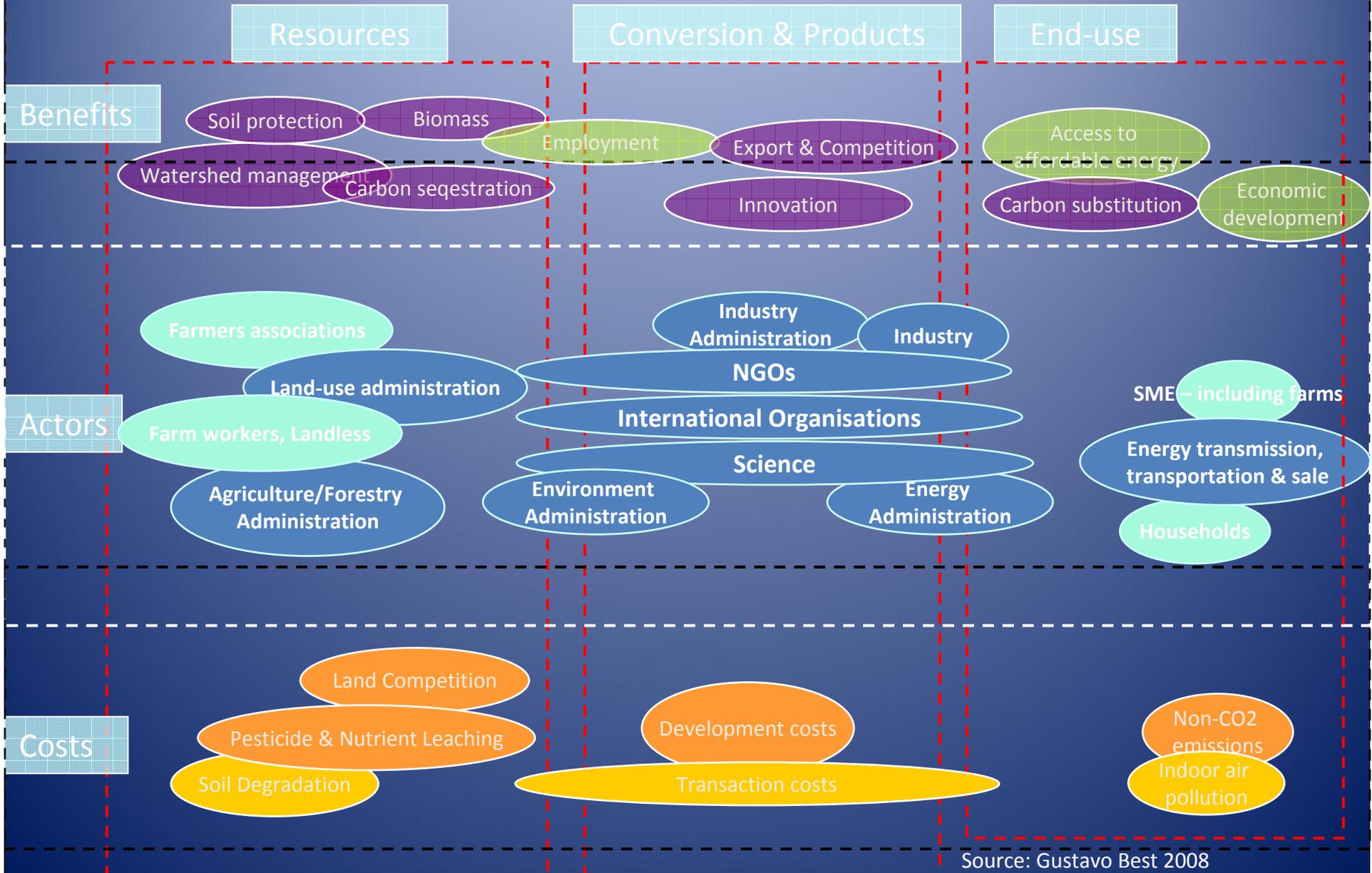
Investment in the Biofuel Sector is Small Compared to other Energy Sectors

Cumulative energy-supply investment in the Reference Scenario, 2007-2030 (Source: WEO 2008)



Investment of \$26 trillion, or over \$1 trillion/year, is needed, but the credit squeeze could delay spending, potentially setting up a supply-crunch once the economy recovers

Biofuels Requires Engagement of Multiple Players to Achieve Multiple Objectives



Source: Gustavo Best 2008

Do we have sufficient land?

- IEA Task 38 highlights constraints on land
- Can we sustain highest yields? Can we improve yields in Africa, South Asia?
- OECD study estimates – we could need as much as 300 million hectares more for all agricultural production.
- Do we want to certify production or manage land use?

Thank You!