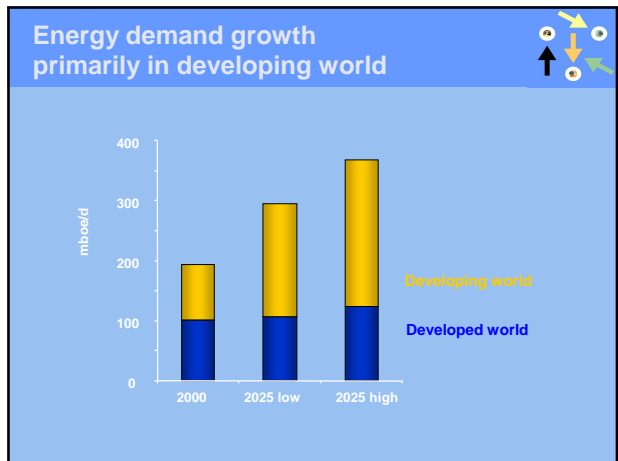
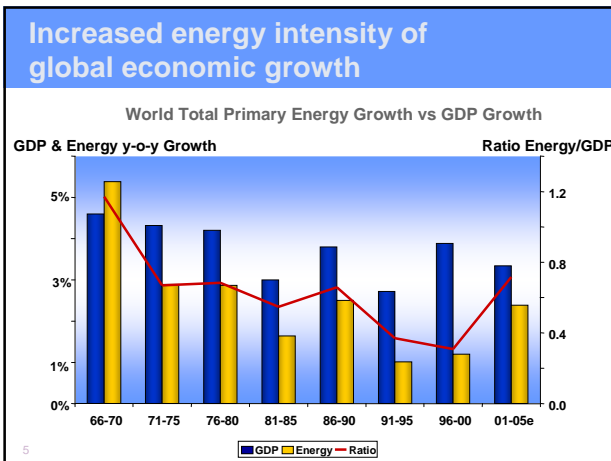
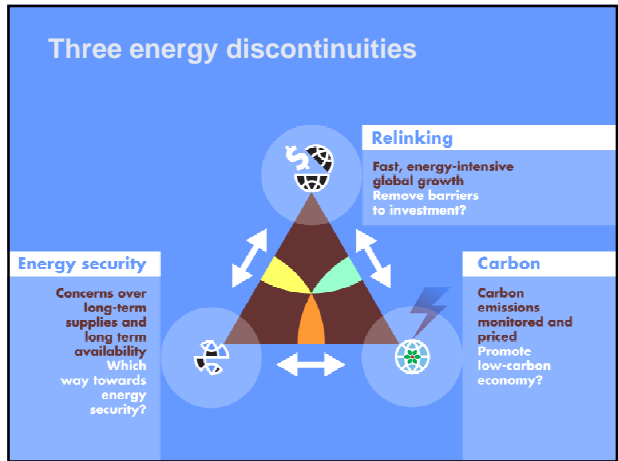
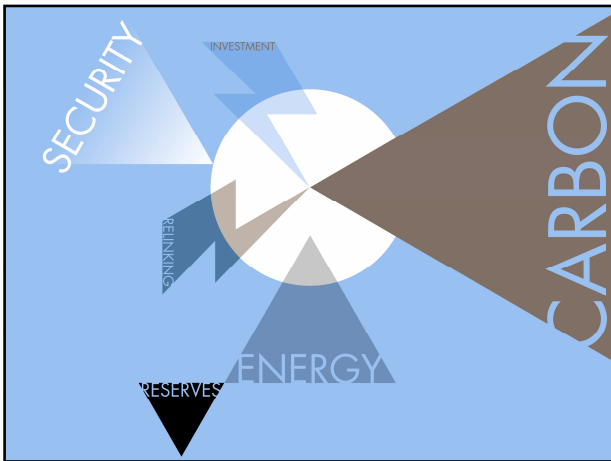
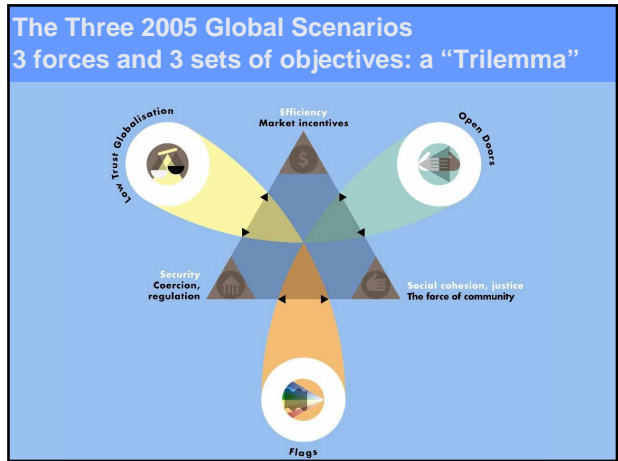
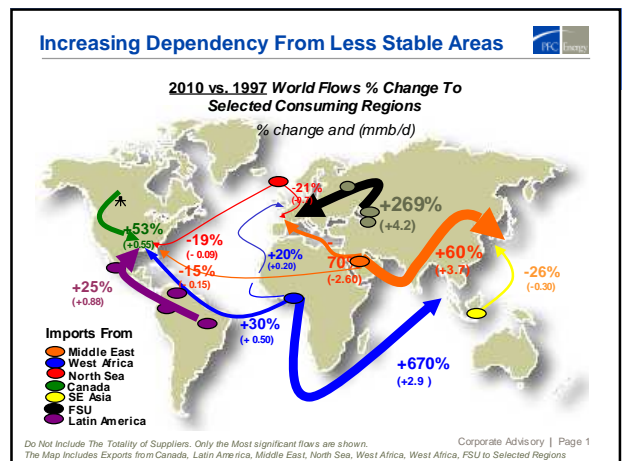
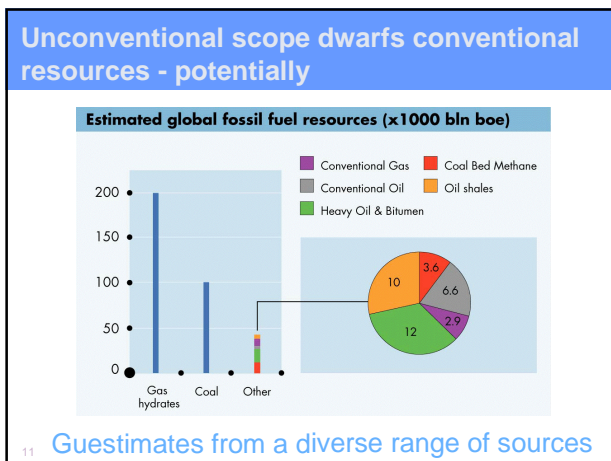
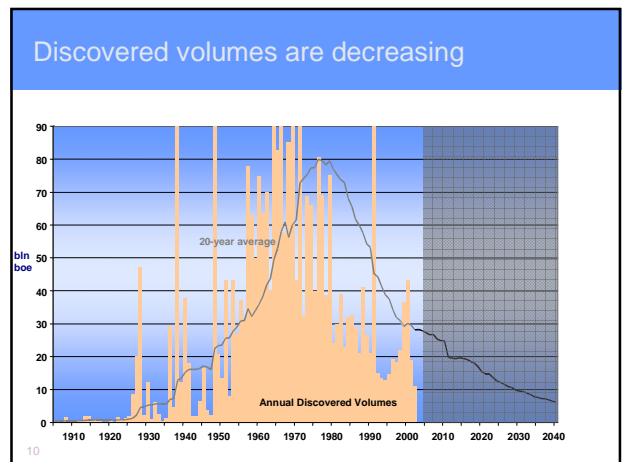
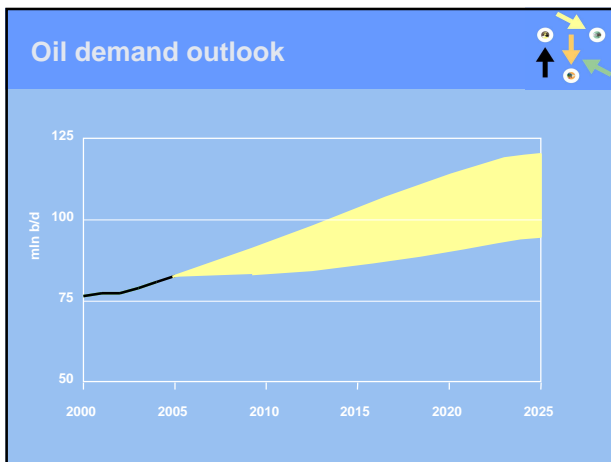
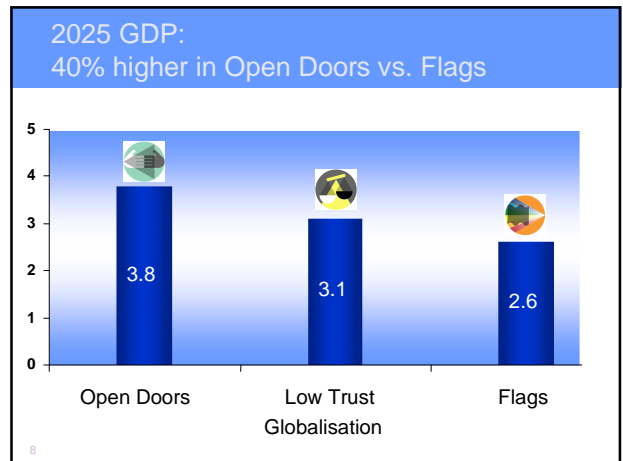
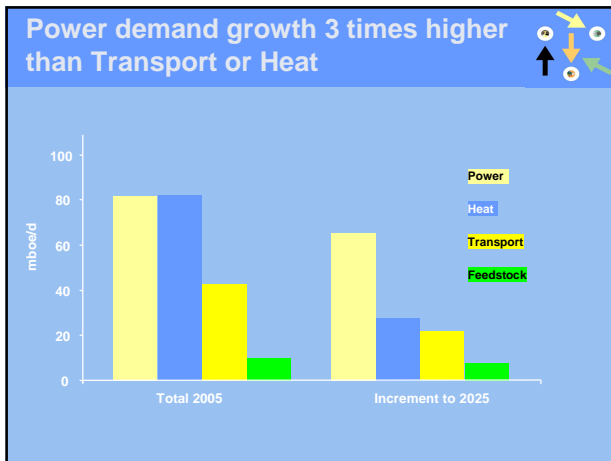





Shell Energy Scenarios

Karl Rose
Senior Strategy Advisor
Royal Dutch Shell plc





Three ways to energy security

	Mechanism	Demand policies	Supply policies
 Low Trust Globalisation	Diversity of supply. Indigenous sources encouraged.	Removal of import subsidies. Fuel and carbon taxation , congestion charging and some other fees. Emergency rationing.	Focus on "safe" sources. Interconnection of networks.
 Open Doors	Open Markets. Global Standards and rules. Global investment facilitation.	Prices internalise environmental costs. Consumer pull for sustainability. Hybrid vehicles.	Consumer-producer dialogue to manage stocks and spare capacities and to promote investment. Global infrastructure.
 Flags	Reduced dependence through conservation and bilateral agreements.	Fuel taxation. Coercive regulations prompting conservation	Preference for indigenous resources. Point-to-point connections.

What shapes long term energy?

The contributors

By 2050

- demography: 8-10 billion people
- incomes: average \$15-25k/capita
- urbanisation: 80% living in cities
- liberalisation: markets increase possibilities
- demand (2-3 times increase)

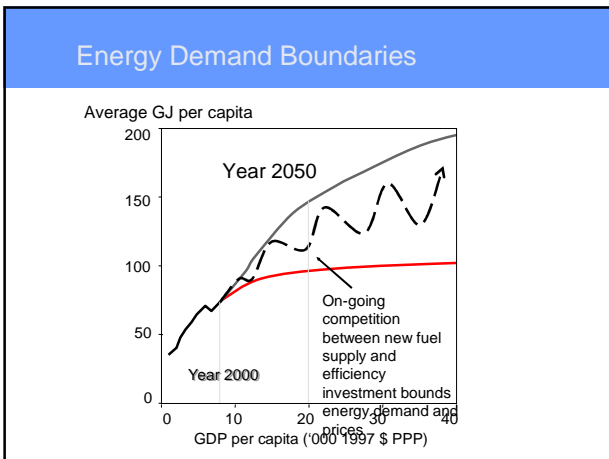
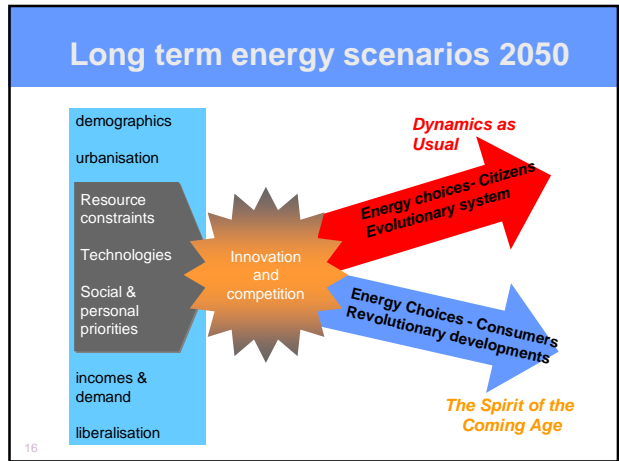
What shapes long term energy?

The contributors

- demography
- incomes
- urbanisation
- liberalisation

The critical

- resource constraints
- technology
- social and personal priorities




Dynamics as Usual

Societal pressures for "clean", "secure" and "sustainable" energy push a direct path to renewables, supported by gas in the medium term


But only after advances in energy storage and a next generation of renewables around 2025. Vehicle efficiency advances prolong the oil transition.

Long term Renewables win

Thin film Solar




Biofuels



Diverse Storage

- Thermal
- Pumped hydro
- Compressed air
- Chemical



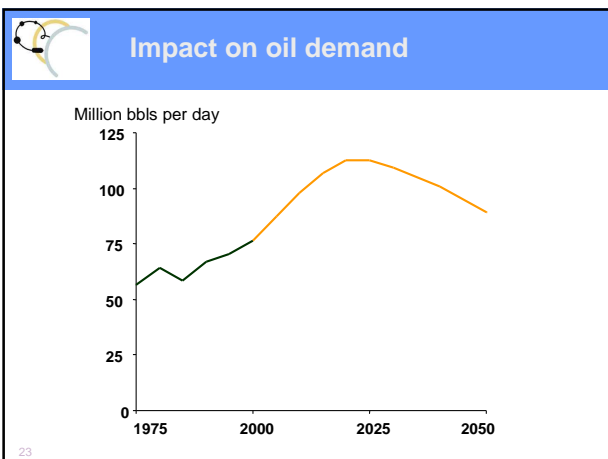
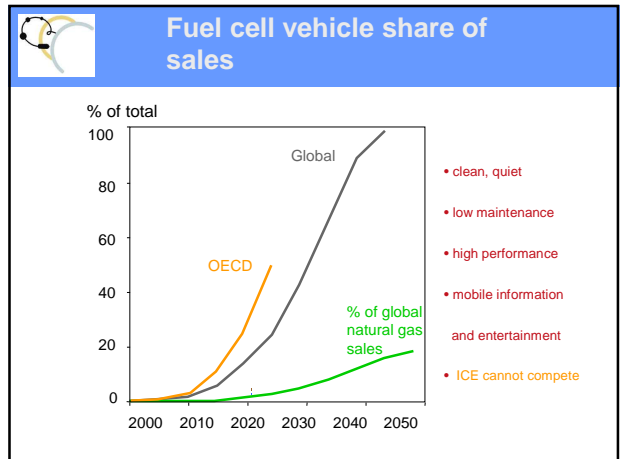
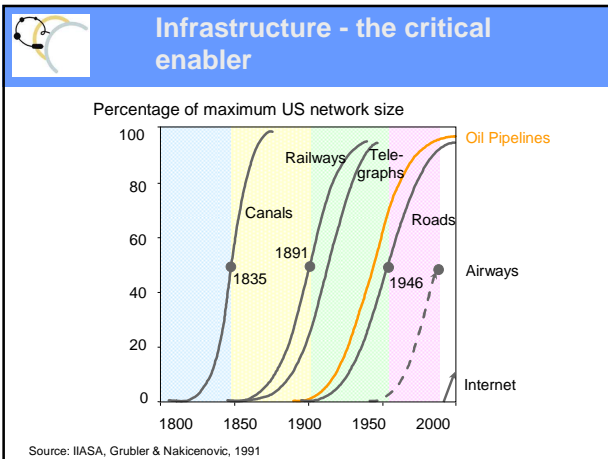
Source: NREL, 2000

Spirit of the Coming Age

Consumer demands for more convenience, flexibility and independence, supported by advanced hydrocarbon technologies, provide an infrastructure bridge to a hydrogen economy.

Longer term this creates a large demand pull for sustainable hydrogen and renewables.

20



- ## Long term energy supply requirements
- ▶ Investments !!
 - ▶ Infrastructure developments
 - ▶ Innovation and technology
 - ▶ Open markets
 - ▶ Transparency
 - ▶ Global trade
- 24

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The Shell Global Scenarios

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