### Shell energy scenarios to 2050

An era of revolutionary change

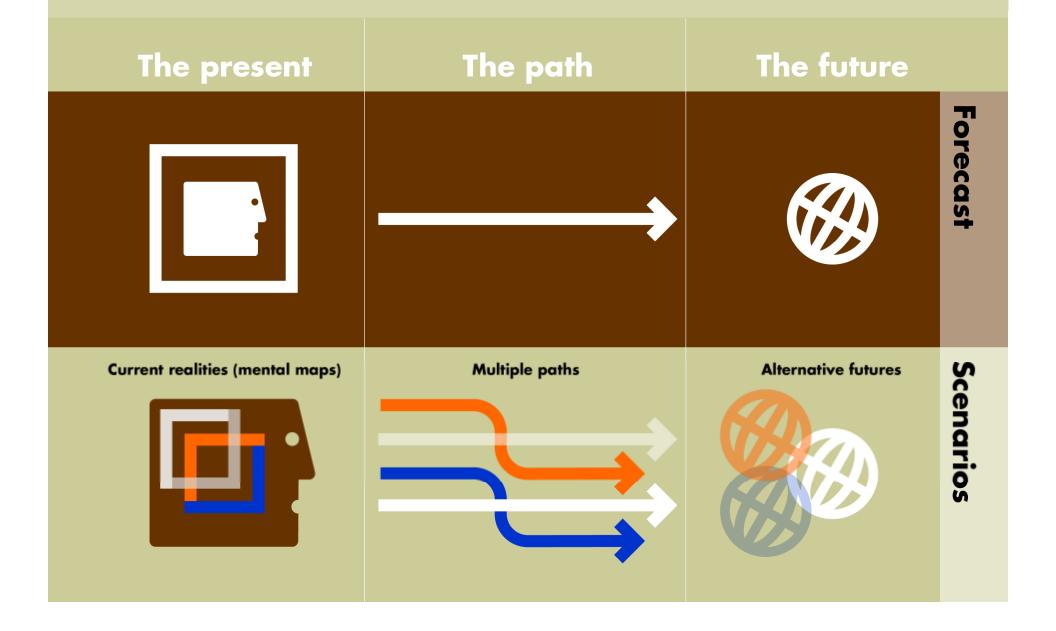


Shell Nederland B.V. Ewald Breunesse

10<sup>th</sup> March 2008



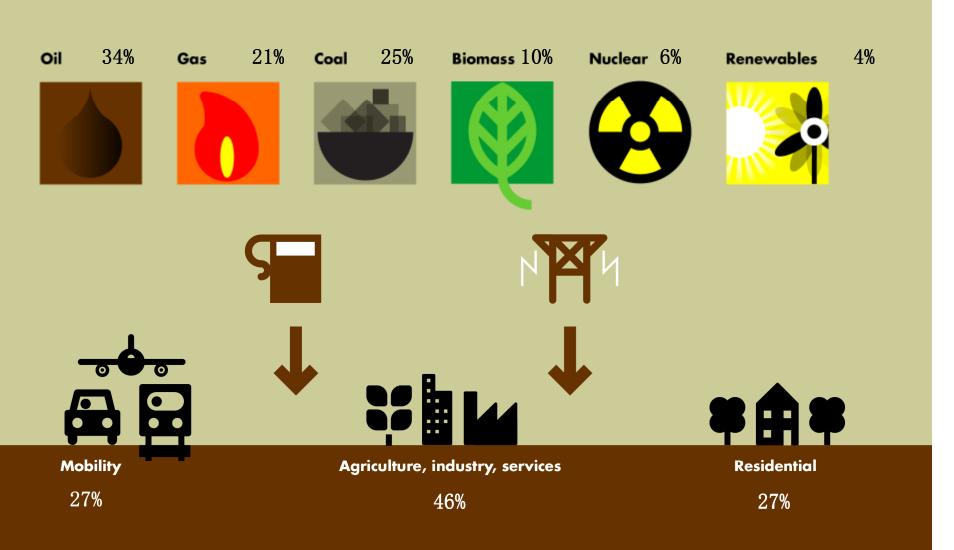
### Scenarios explore alternative futures



#### Disclaimer statement

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## The energy system today sets the context for the future

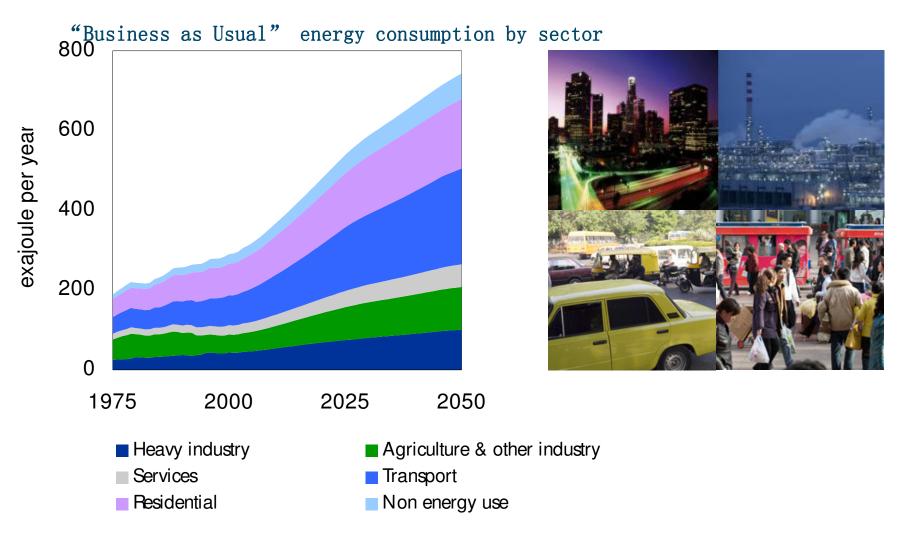


Source: Shell International BV; UN Population Division  $\,$ 

World population 6.6 bln; 50% in urban environment

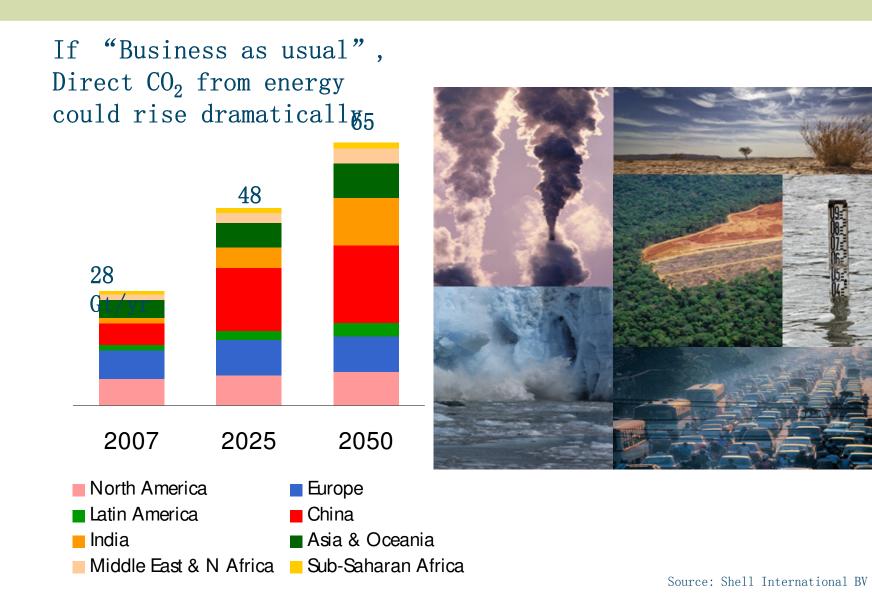


# "Business as Usual": energy demand is set to increase dramatically



Source: Shell International BV and Energy Balances of OECD and Non-OECD Countries ©OECD/IEA 2006

### Environmental stresses are increasing



# There are choices to be made and actions to be taken to tackle the challenges

#### Emission reduction











A further shift Nuclear to natural gas power

Renewables

Bioproducts

Carbon capture and storage

#### Energy conservation and efficiency







Road transport



Buildings

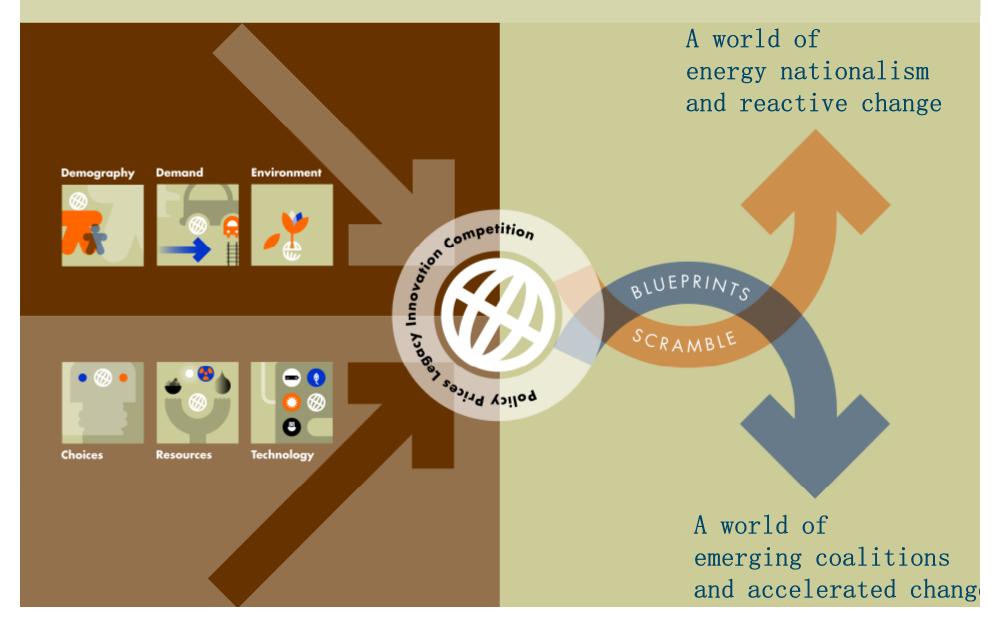


Low energy appliances



Doing things differently

# Shell energy scenarios help us to imagine alternative futures





SCRAMBLE

# Scramble - Security of supply and fear of losing economic growth











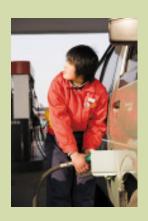










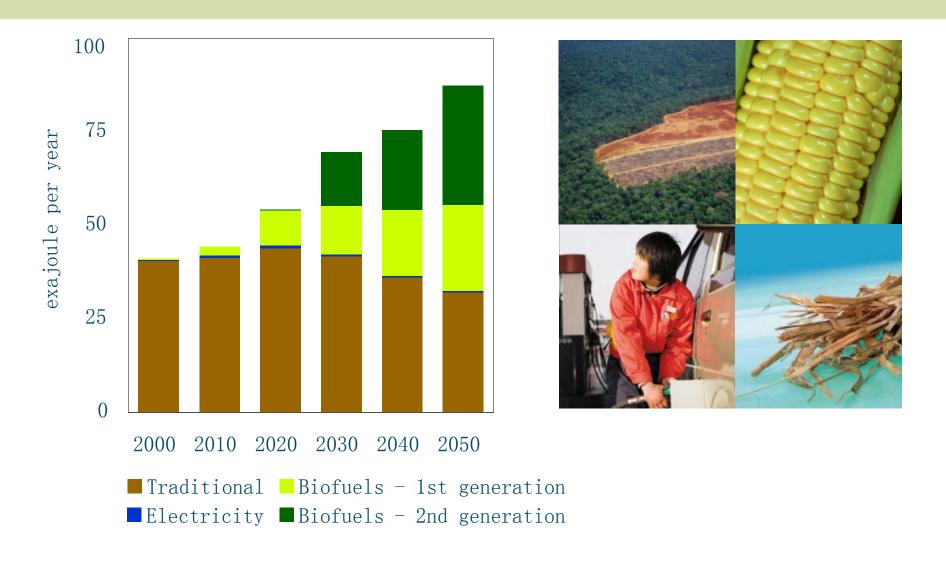






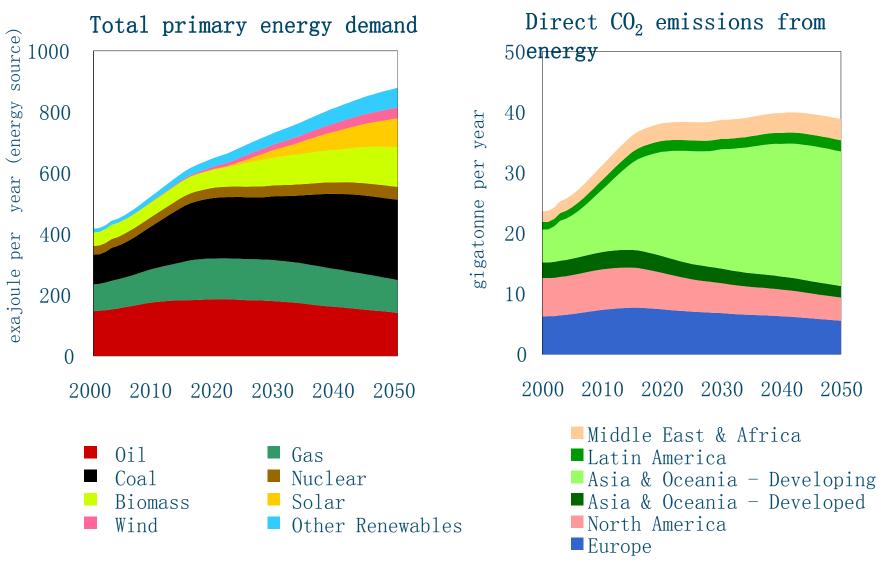


### Scramble - Biomass diversifies liquid fuel mix

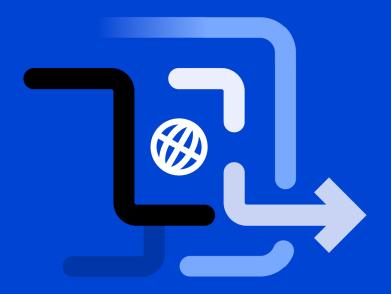


 $Source: Shell\ International\ BV\ and\ Energy\ Balances\ of\ OECD\ and\ Non-OECD\ Countries @OECD/IEA\ 2006$ 

## Scramble - supply side focus but hits constraints



Source: Shell International BV and Energy Balances of OECD and Non-OECD Countries@OECD/IEA 2006



**BLUEPRINTS** 

### Blueprints – Energy security and sustainability

















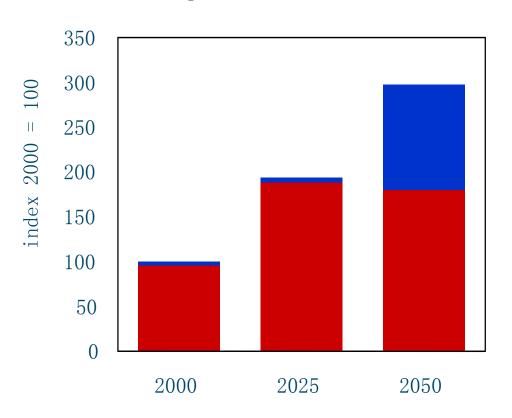






# Blueprints - Efficiency and innovation in transport

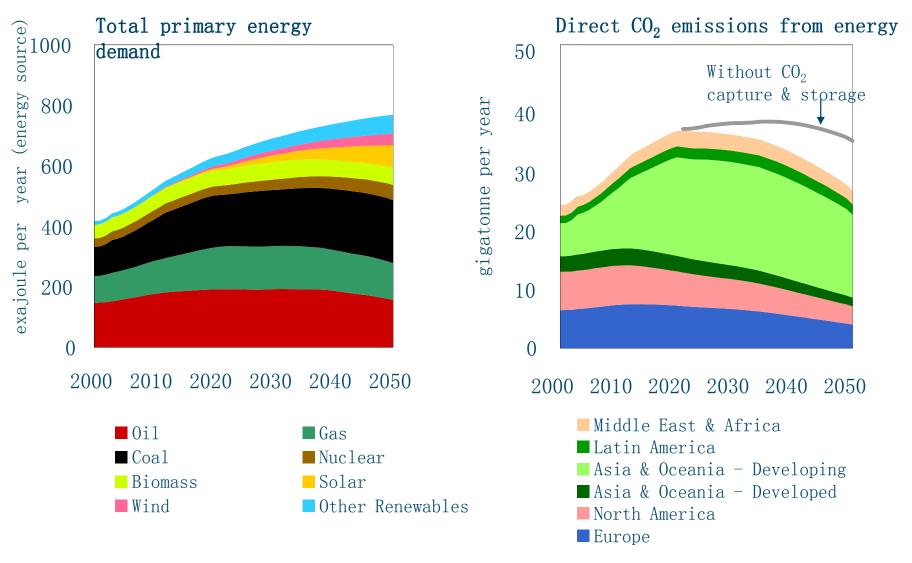
#### Passenger distance travelled (world)





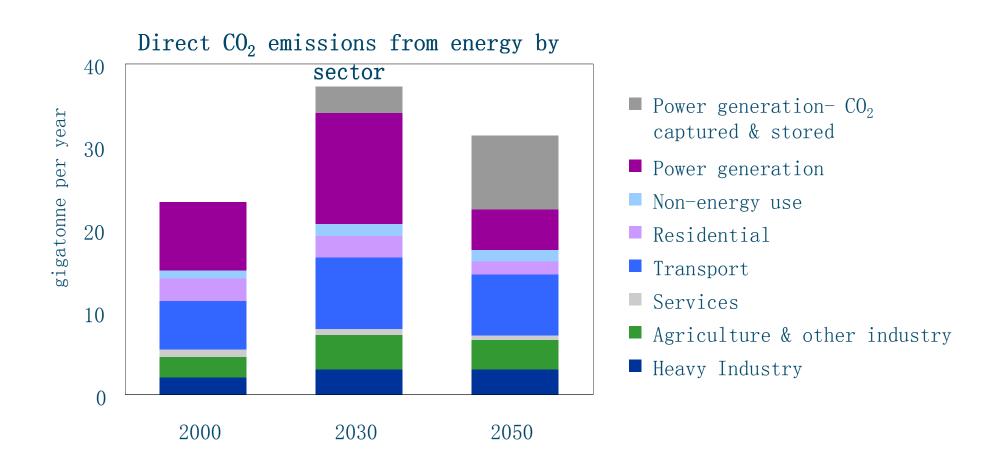
Liquid fuel Electric transport

## Blueprints - GHG pricing stimulates efficiency and technology development



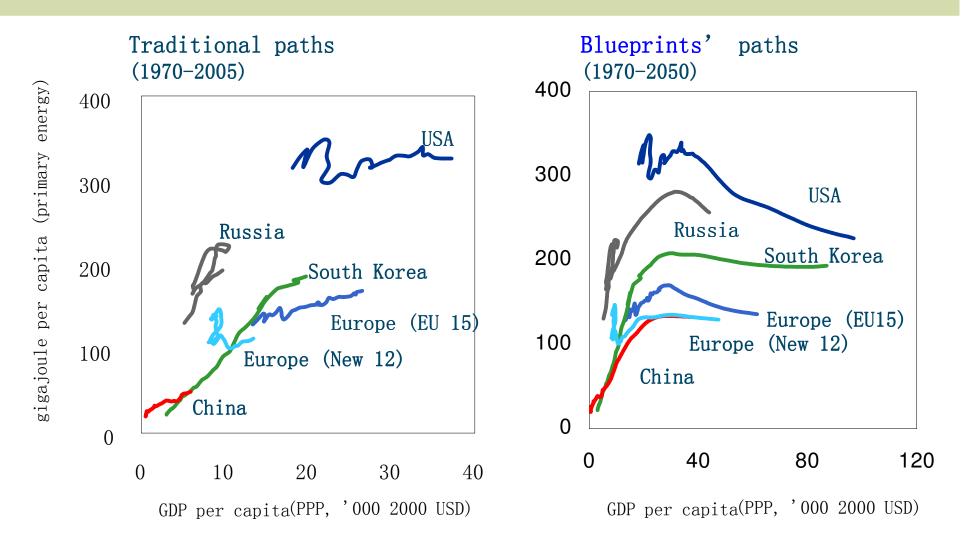
Source: Shell International BV and Energy Balances of OECD and Non-OECD Countries@OECD/IEA 2006

# Blueprints – CO<sub>2</sub> capture and storage abates ~30% of total emissions by 2050



Source: Shell International BV and Energy Balances of OECD and Non-OECD Countries©OECD/IEA 2006

## Sustainability will require a revolution in energy use



Source: Shell International BV, Oxford Economics and Energy Balances of OECD and Non-OECD Countries © OECD/IEA 2006

