# **Driving Clean Coal Forward**

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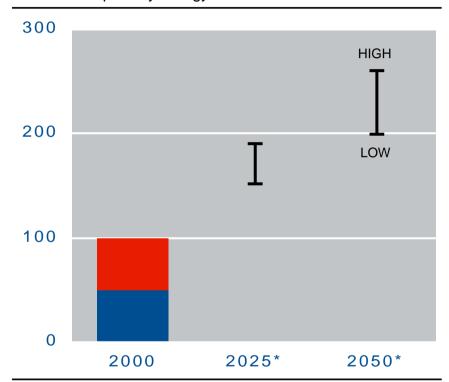
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### **Growth Energy Demand**

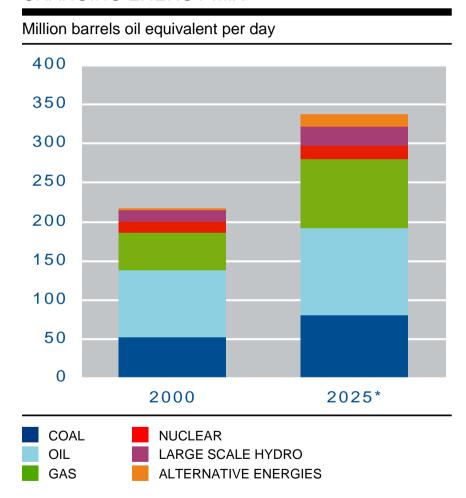
#### RISING GLOBAL ENERGY DEMAND

100= Global primary energy demand 2000



REST OF THE WORLD
OECD

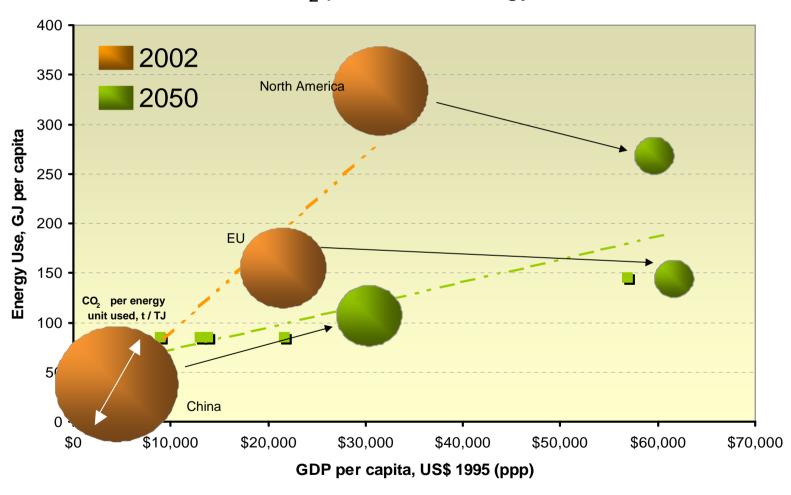
#### **CHANGING ENERGY MIX**



<sup>\*</sup> Shell estimates

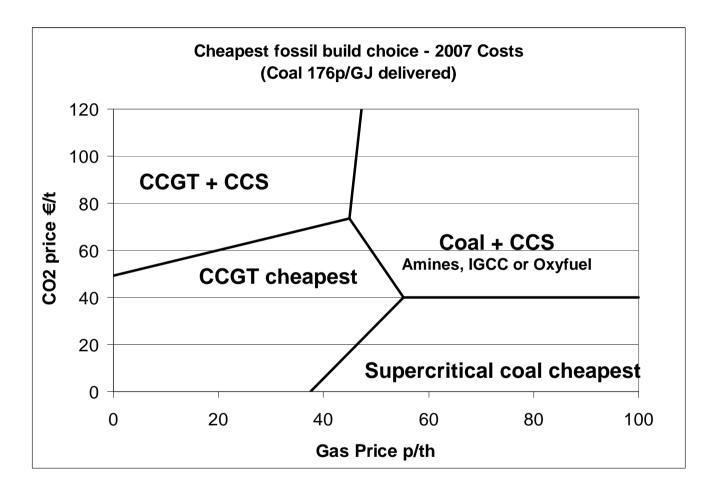
## Pathways to 2050

A significant shift required in both "energy per GDP" and "CO<sub>2</sub> per unit of energy used"



Source: World Business Council for Sustainable Development

### Indifference curves based on fuel & CO<sub>2</sub> prices: LRMC



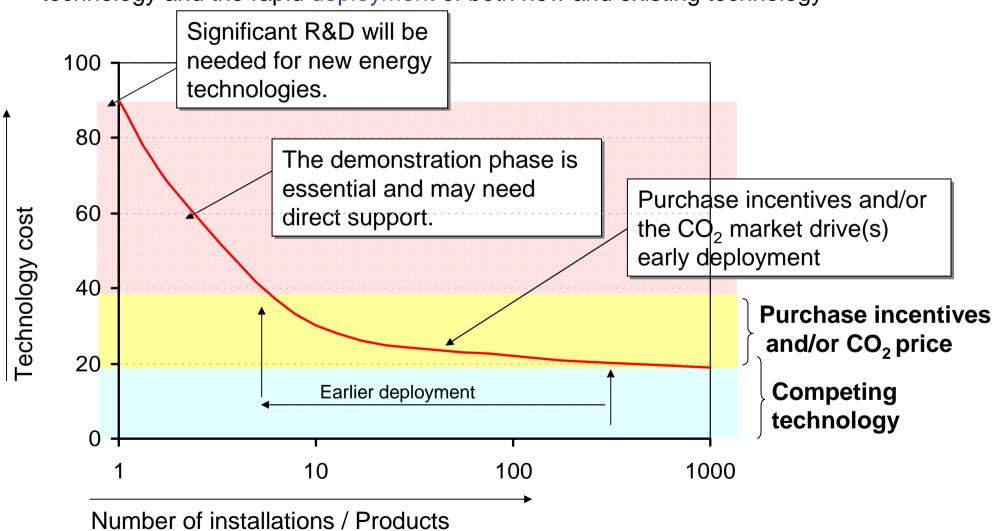
Source: E.ON, presentation at European Gasification Conference, Sept 2007

- Preferred technology depends on gas price and emitted CO2 cost assumptions
- Lower coal prices will move the coal boundaries to the left
- IGCC + CC is a better alternative to SC + CC under all plausible assumptions



## Technology development and deployment

Future policy must focus on both the development and demonstration of new technology and the rapid deployment of both new and existing technology







# Policies needed vs. policy developments so far

	Power Generation / Industry & Manufacturing	Transport	Commercial & Domestic (Buildings)
Discover & Develop	<ul> <li>Support for infrastructure (e.g. grids &amp; pipelines)</li> <li>Broad energy production and use R&amp;D support for advanced fuel development</li> </ul>	Urban planning decisions.	
			Education and awareness.
Demonstrate	<ul> <li>Fiscal support for large-scale CCS demonstrations</li> <li>Extra ETS allowances to speed up roll out of early CCS projects</li> </ul>	<ul> <li>Fiscal support for early 2<sup>nd</sup> generation biofuel manufacture.</li> <li>Public transport infrastructure</li> </ul>	Encouraging radical design
Deploy	<ul> <li>"Cap-and-Trade"</li> <li>CCS rules and recognition, incl market based funding</li> <li>mechanisms</li> <li>Renewable Energy Certificates</li> <li>"Fast-track" planning</li> </ul>	<ul> <li>Vehicle efficiency standards</li> <li>CO<sub>2</sub> certification of fuels, leading to fuel standards.</li> <li>Consumer behaviour</li> <li>Use of public transport</li> </ul>	<ul> <li>Efficiency standards (appliances, air-con)</li> <li>Use of project mechanisms linked to GHG market.</li> <li>Encouraging "electrification".</li> </ul>

#### Conclusions

- Coal will continue to play a fundamental role in the EU energy mix in the coming decades
- A clear policy framework is needed for clean coal technologies to be deployed
- Large scale CO2 transport and storage infrastructure is on the critical path
  - it needs the promise of large scale CO2 capture to gain momentum
  - IGCC technologies is in our view the technology mature enough to fulfil this promise
  - short-term, small scale, point-to-point solutions will have significant future regret value
- Urgency is essential

