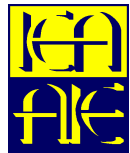


World Energy Outlook 2003
Insights:
Global Energy Investment Outlook

Laura Cozzi
Economic Analysis Division
International Energy Agency
January 2003

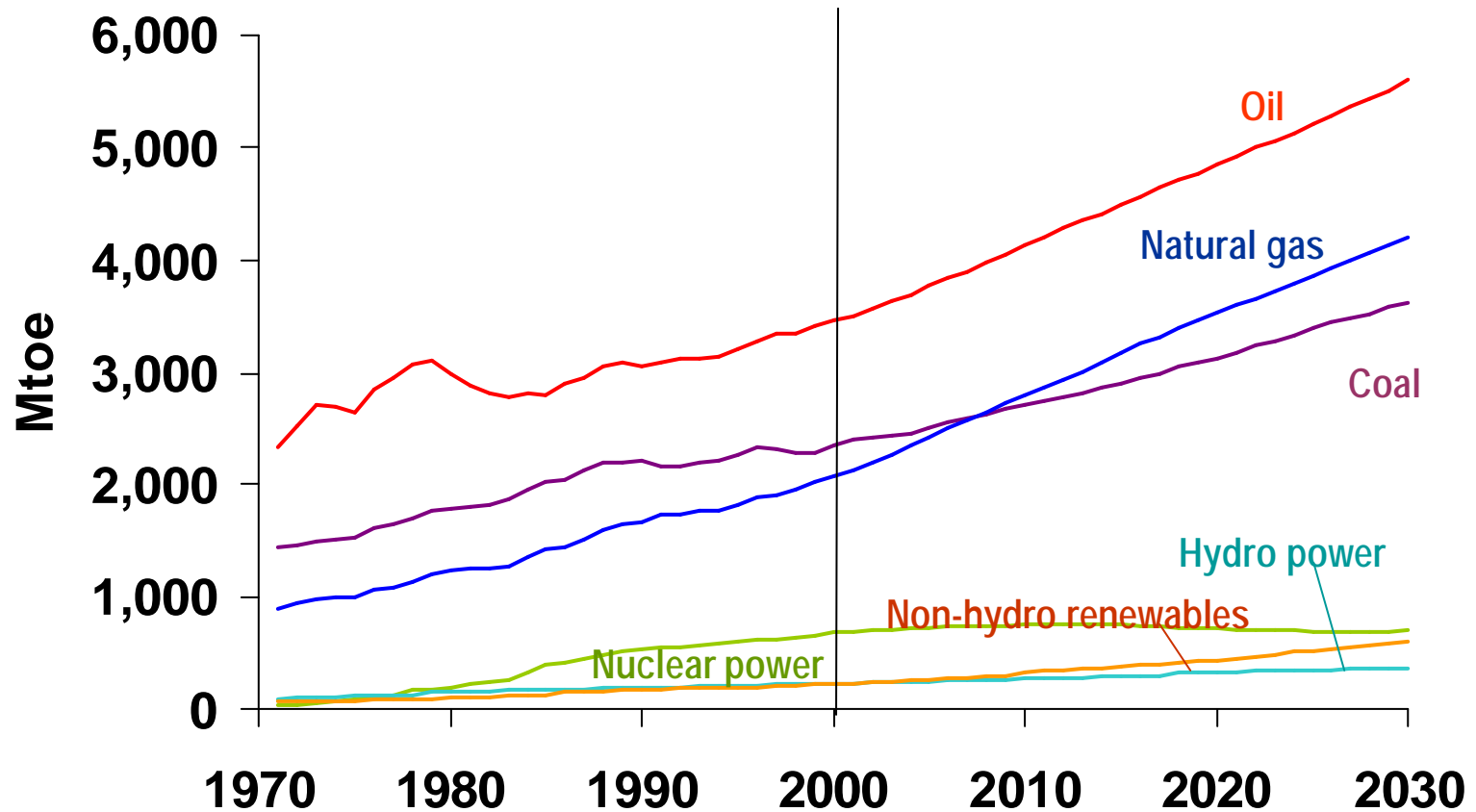


World Energy Outlook Series

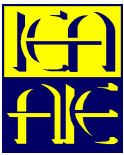
- World Energy Outlook 1998
- World Energy Outlook 1999 Insights *Looking at Energy Subsidies: Getting the Prices Right*
- World Energy Outlook 2000
- World Energy Outlook 2001 Insights: *Assessing Today's Supplies to Fuel Tomorrow's Growth*
- World Energy Outlook 2002 (2nd edition issued)
- World Energy Outlook 2003 Insights: *Global Energy Investment Outlook*



World Primary Energy Demand

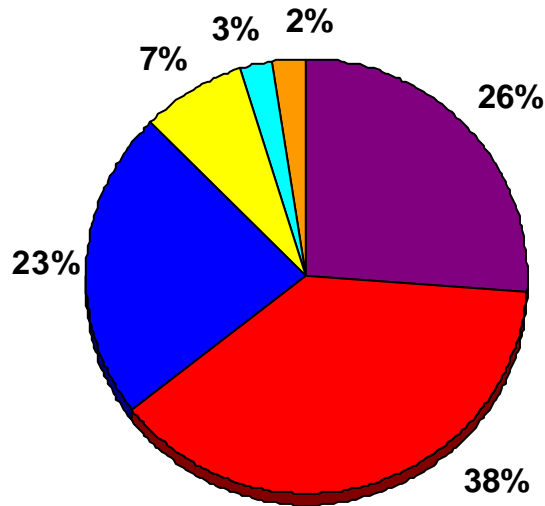


Gas grows fastest in absolute terms & non-hydro renewables fastest in % terms, but oil remains the dominant fuel in 2030

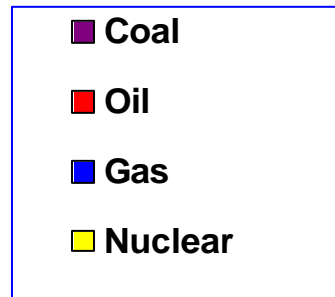
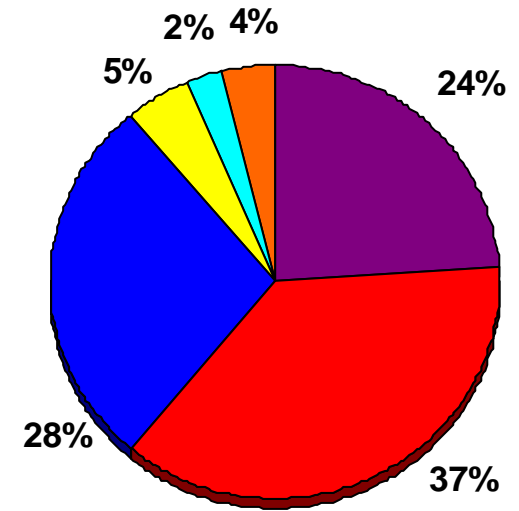


Fuel Shares in World Primary Energy Demand

2000



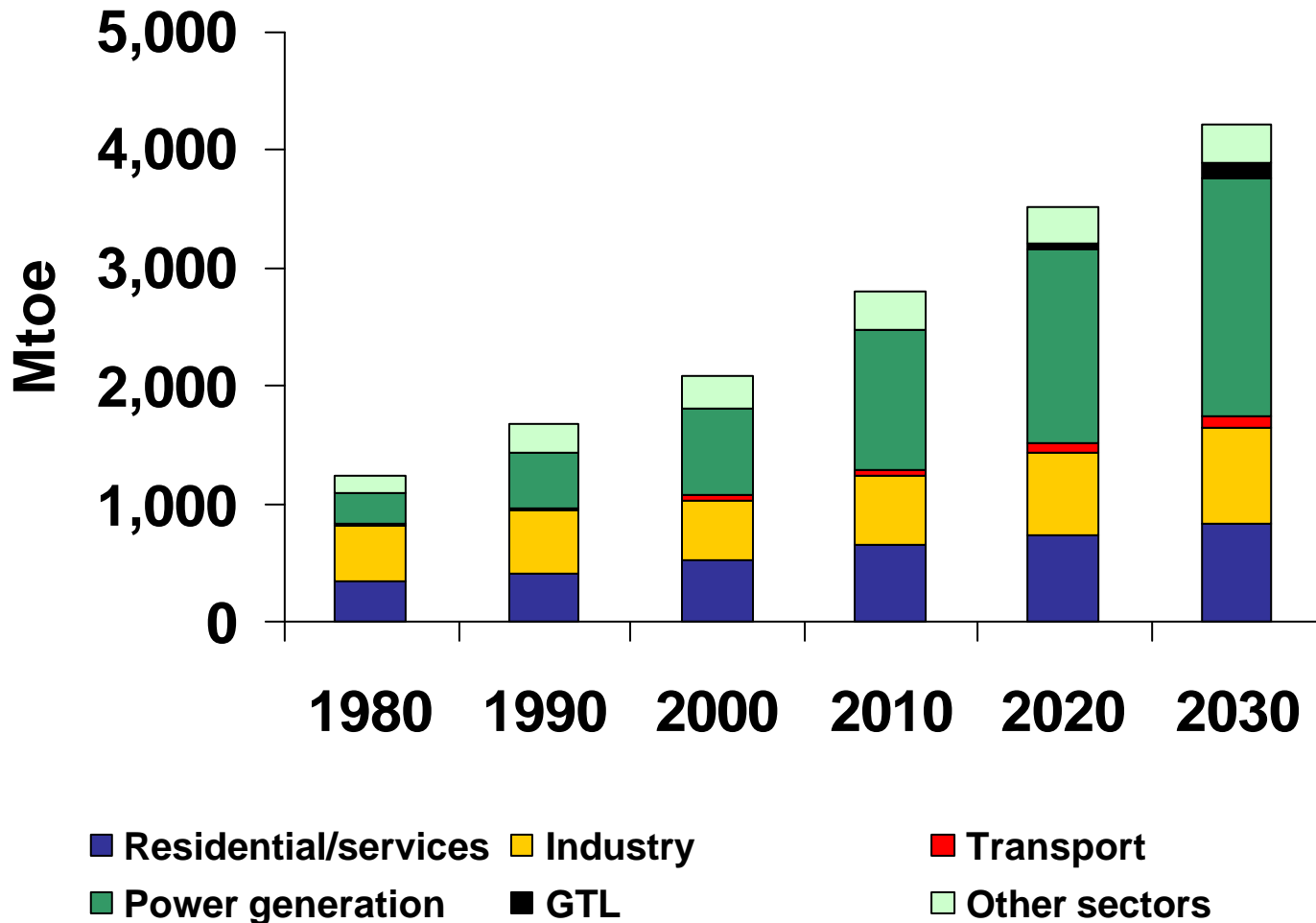
2030

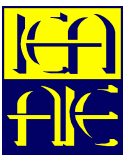


Natural gas and non-hydro renewables take market share from coal, nuclear power and oil

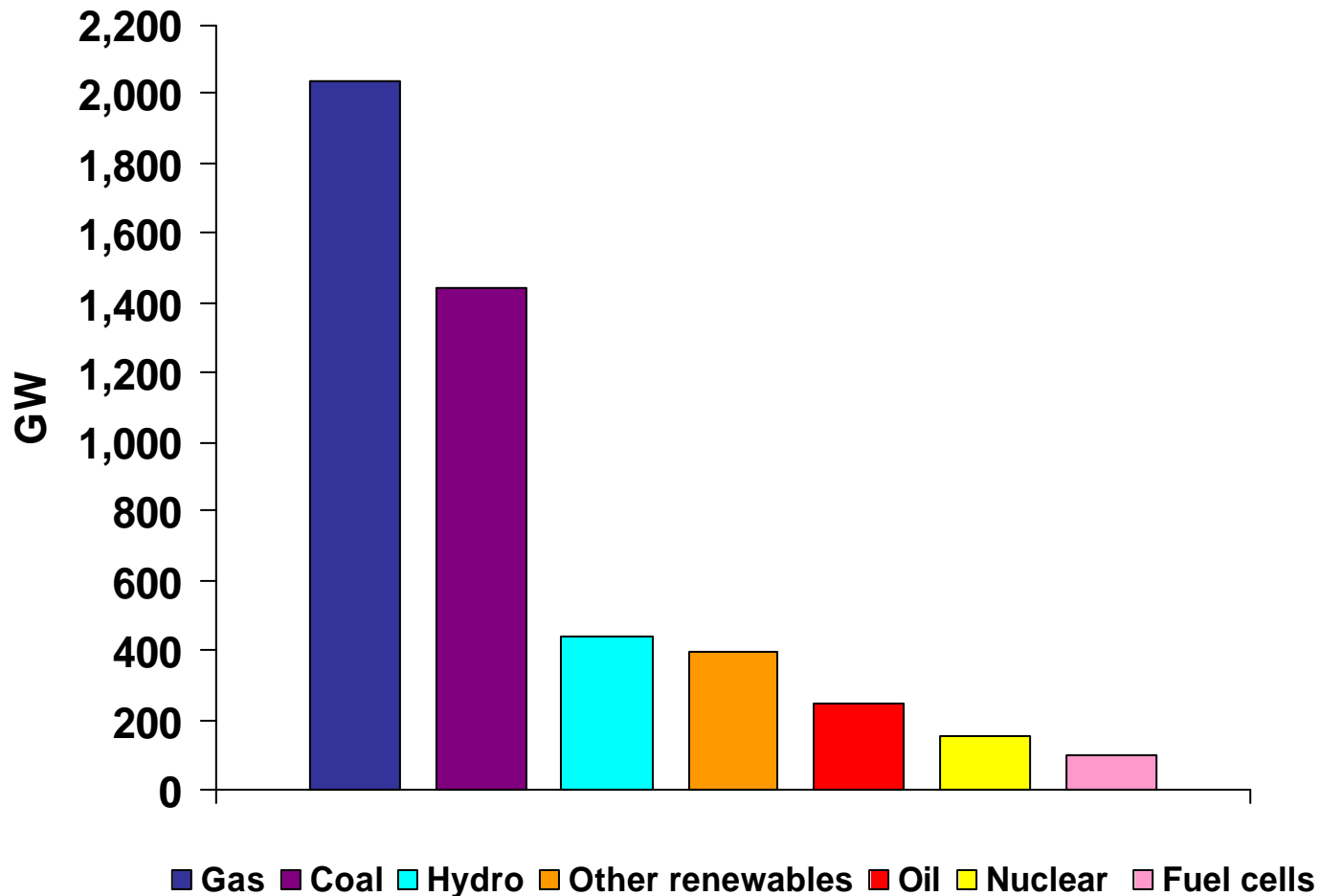


World Natural Gas Demand



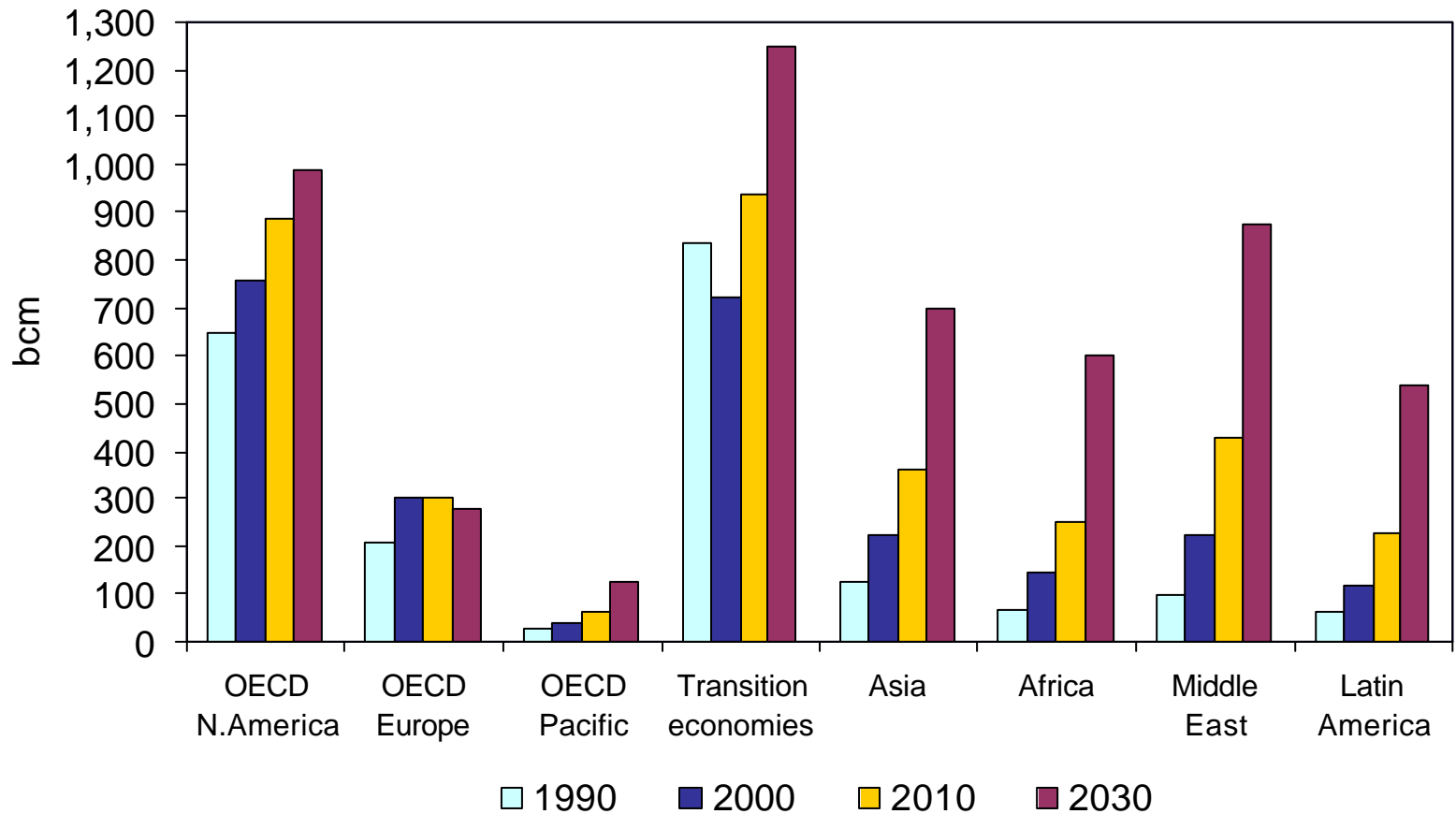


World Power-Generation Capacity Additions, 2000-2030



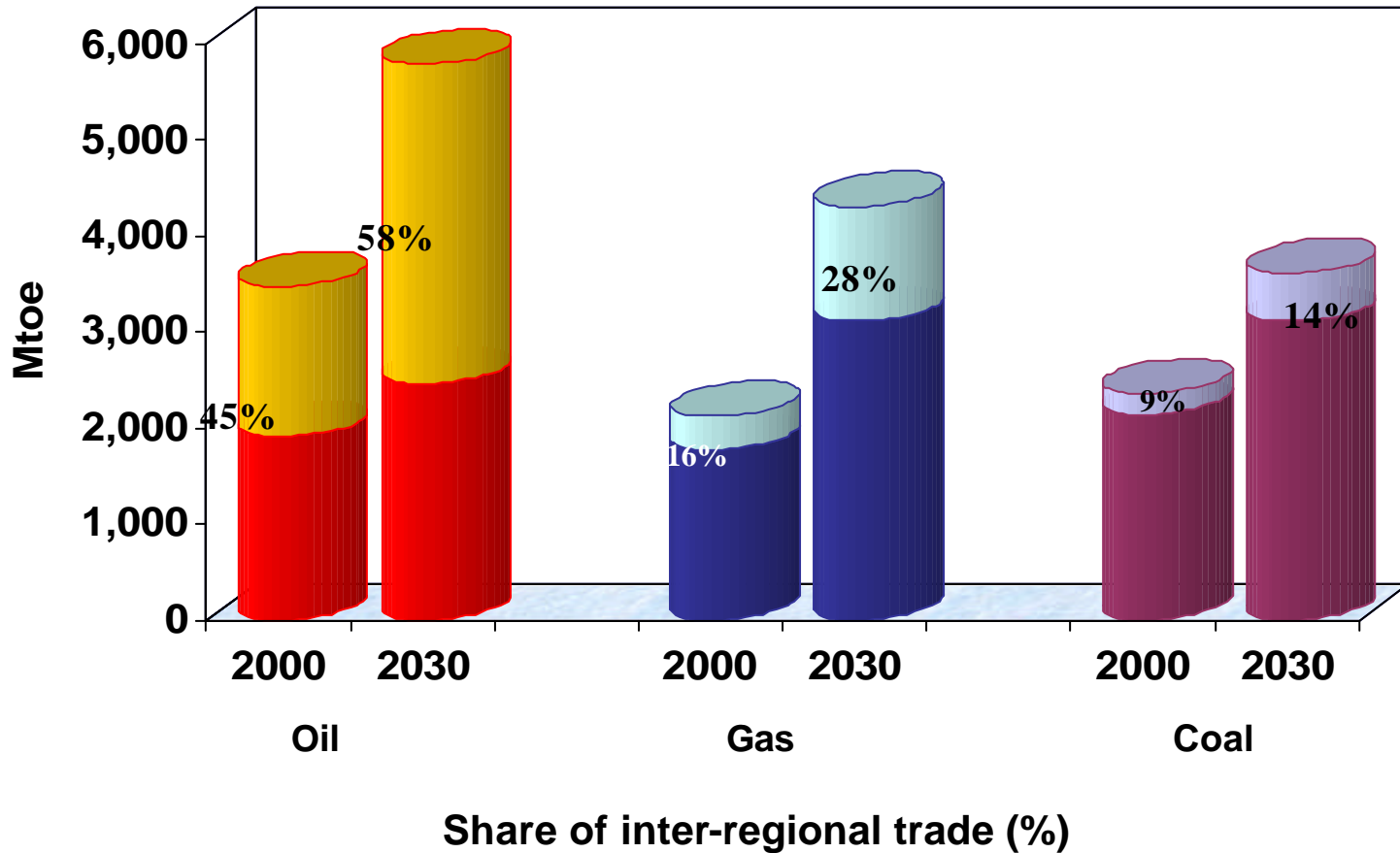


Gas Production by Region



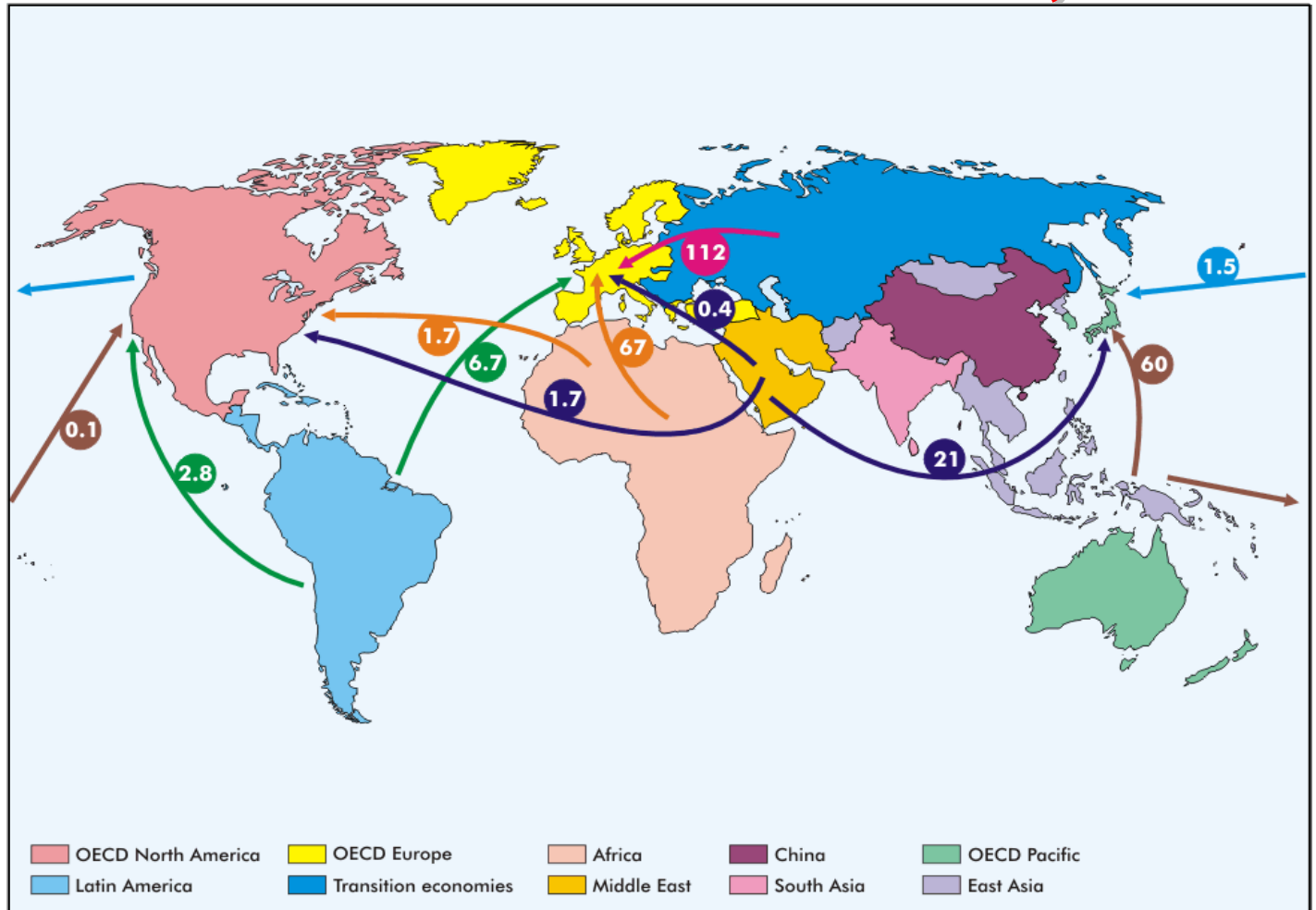


Share of Trade in World Fossil-Fuel Production



Energy trade between regions more than doubles between now and 2030

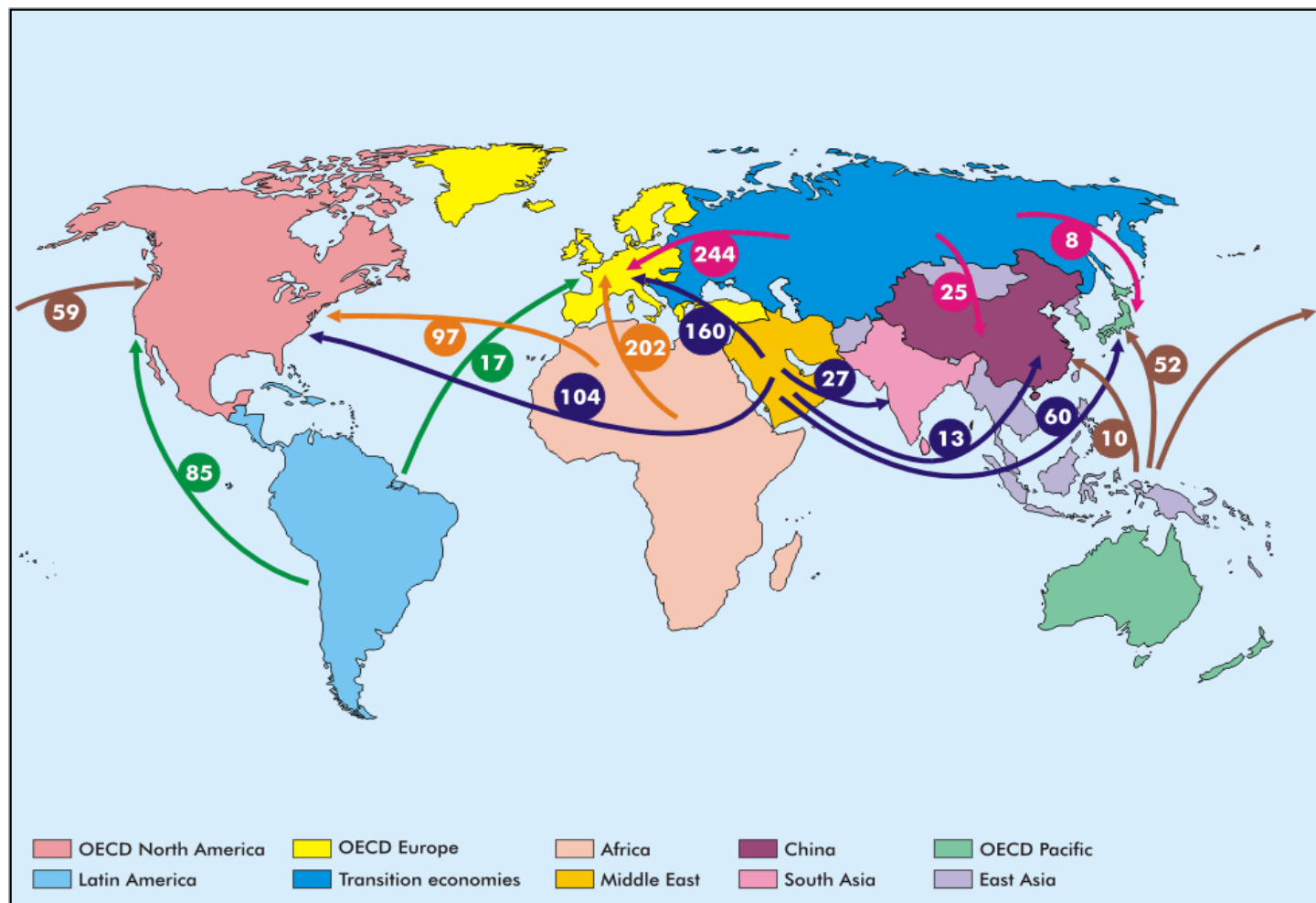
Net Gas-Trade Flows, 2000



Bcm

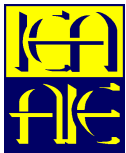
Most gas trade today is concentrated on European & East Asian markets

Net Gas-Trade Flows, 2030



The Middle East overtakes the transition economies as the world's biggest gas-exporting region

Bcm



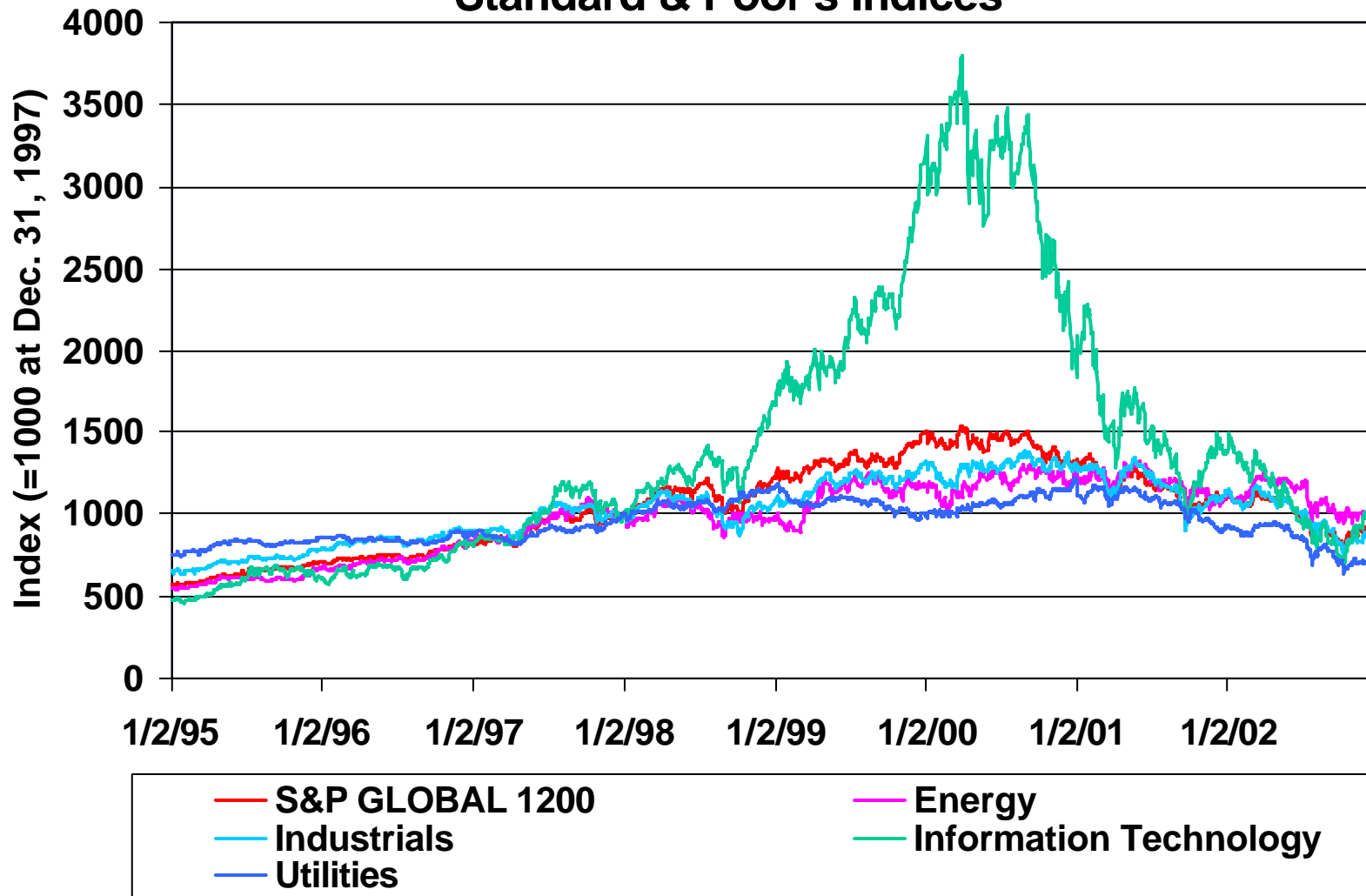
Implications of WEO2002 Projections

- The projections raise policy serious concerns:
 - ◆ security of energy supplies
 - ◆ investment in energy infrastructure
- Will energy investment take place in a timely fashion, especially in developing countries and transition economies?



Performance of the Energy Sector: An Example

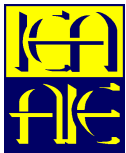
Standard & Poor's Indices





Global Energy Investment Outlook Objectives

- Quantify the investment requirements in the energy supply chain between 2000 and 2030
- Identify risks and uncertainties surrounding energy investment such as evolution of capital costs due to technology development and its access to capital
- No reference publications currently available, regarding long-term energy investment prospects



Scope of the Study

- WEO 2002 as a starting point: no new sets of projections
- Will span investment in exploration and production to distribution to final consumer (where possible) for coal, oil, gas, electricity, renewables, and uranium
- Investment in final demand sectors not considered



Approach to and Organization of the Study

- Intra-agency project: led by EAD with input from EED, NMC, EET, OMD and ESD
- Started in December 2002 and completed by November 2003
- Consultation with experts in governments, energy companies, financial institutions, and international organizations
- Peer-review process



Structure of the Study

- Introduction
- Outlook for Global Energy Investment Needs to 2030
- Oil
- Gas
- Coal
- Renewables
- Nuclear
- Electricity



Global Energy Investment Needs to 2030

- **What are the trends of global energy investment to 2030?**
 - ◆ **Present overview of investment needs by fuel and by region**
 - ◆ **How are energy investment requirements significant relative to the size of economy, financial resources, etc.?**
- **What are the constraints on the access of energy investment to capital?**
 - ◆ **Review sources of finance and financing mechanisms**



Global Energy Investment Needs to 2030 (continued)

- ◆ Analyze financial performance and capital structure of the energy sector: Is energy investment more risky?
- ◆ Assess the principal uncertainties associated with energy investment such as energy pricing, political instability, and energy sector reforms
- ◆ Identify policy environment catering to energy investment, especially governance issues



Gas: Methodology

- **Exploration and production**
 - ◆ Determine existing and new production capacity per basin
 - ◆ Estimate basin capital cost per unit of production
- **Transport**
 - ◆ Disaggregate trade flows by mode
 - ◆ Estimate capacity requirements for LNG/pipelines
 - ◆ Estimate current and future capital cost
- **Storage/Distribution**
 - ◆ Estimate additional capacity requirements
 - ◆ Estimate capital cost



Gas: Risks and Uncertainties

- **Impacts of geology and technology on capital cost of E&P and transport**
- **Political stability and government policy toward the gas sector**
 - ◆ **The extent of openness of E&P operation to foreign companies**
 - ◆ **Taxes/charges on pipelines as well as E&P**
- **Interdependency with other energy investment**
 - ◆ **Pipelines/LNG facilities and power plants and/or other end users**
- **Impacts of inter-fuel and intra-fuel competition**