

# Global and Local Peaks in Oil and Gas Production

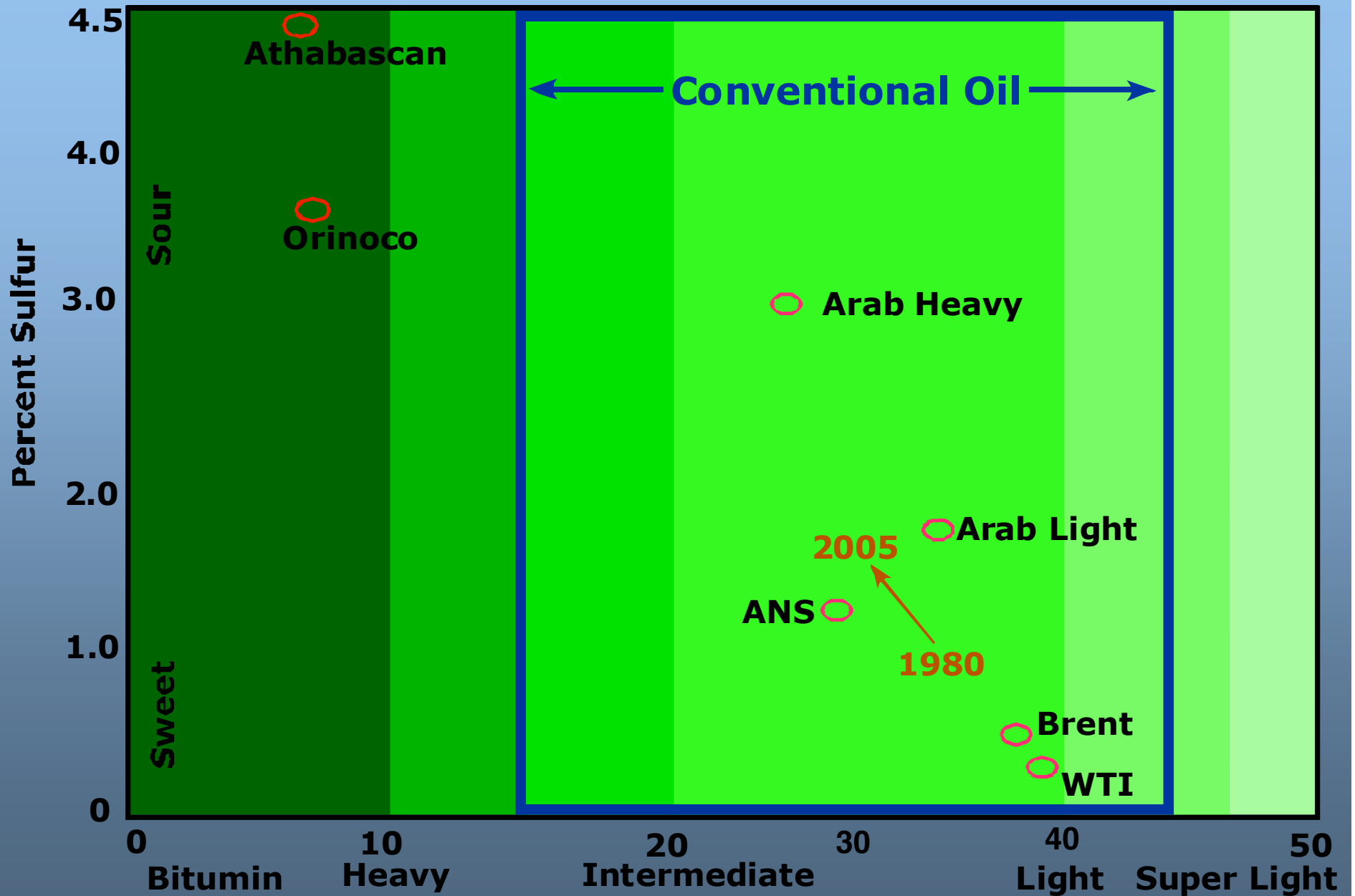
James S Jackson

Department of Geology

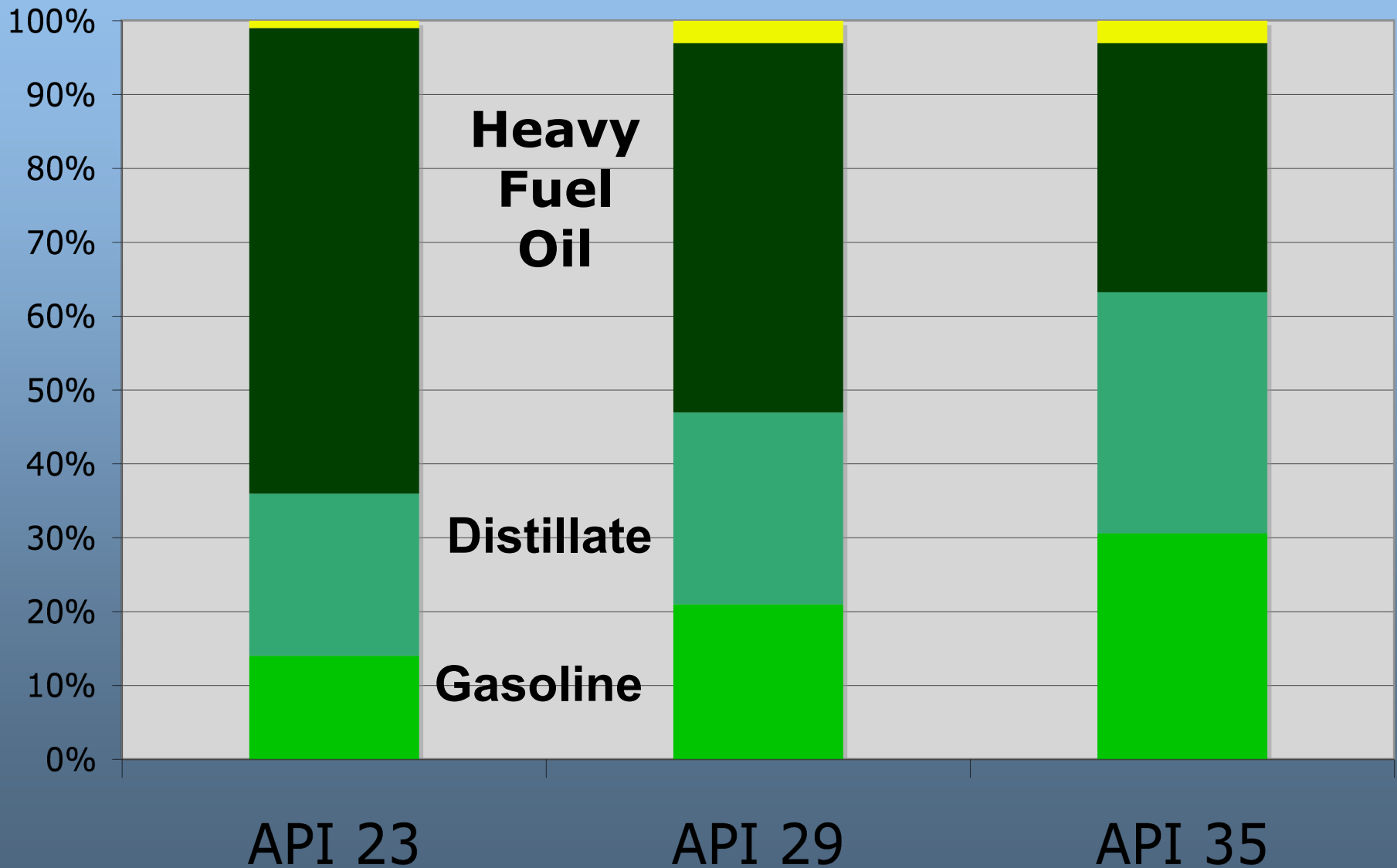
Portland State University

Portland, Oregon

# Oil Gravity versus Sulfur Content



# Refinery Yields



M King Hubbert (1969)

US Oil Consumption

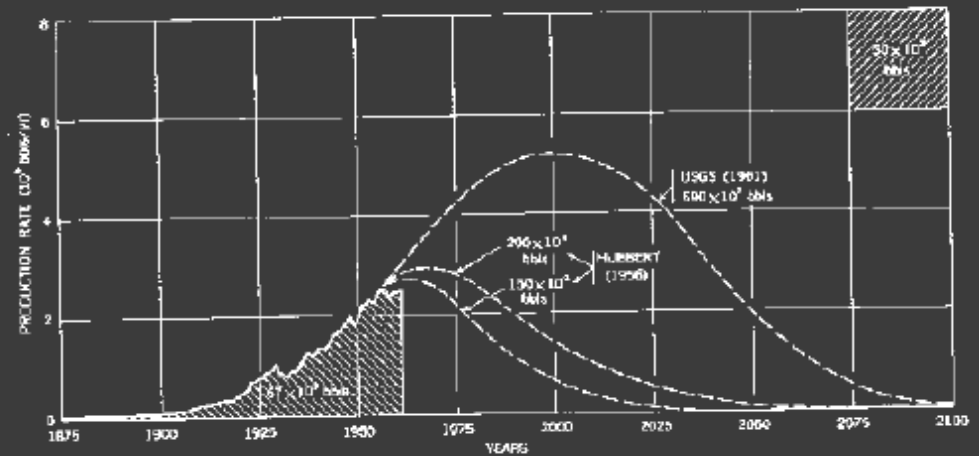


FIGURE 87.—Comparison of complete cycles of U.S. crude-oil production based upon estimates of 150–200 and 500 billion barrels for  $Q_{\infty}$ .

World Oil Consumption

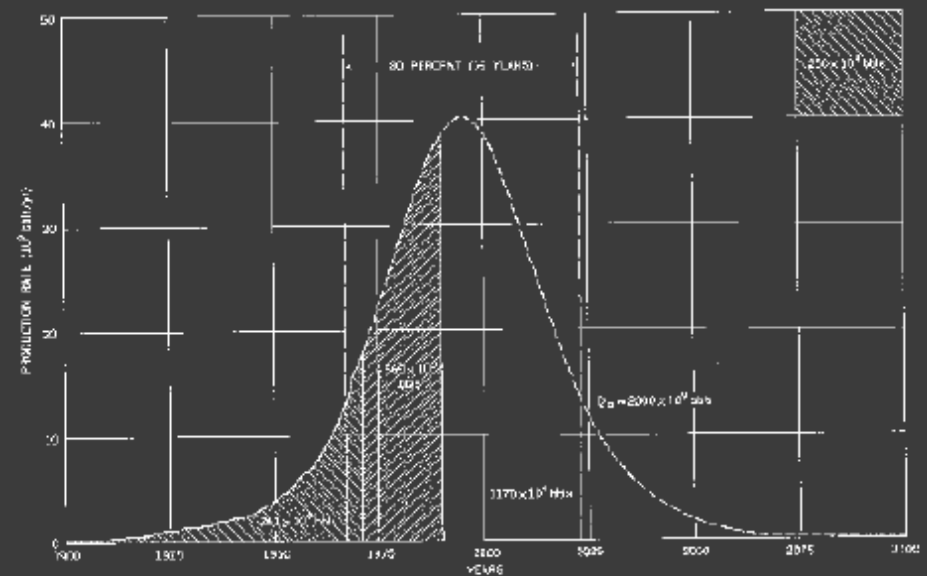


FIGURE 88.—Estimate as of 1972 of complete cycle of world crude-oil production.

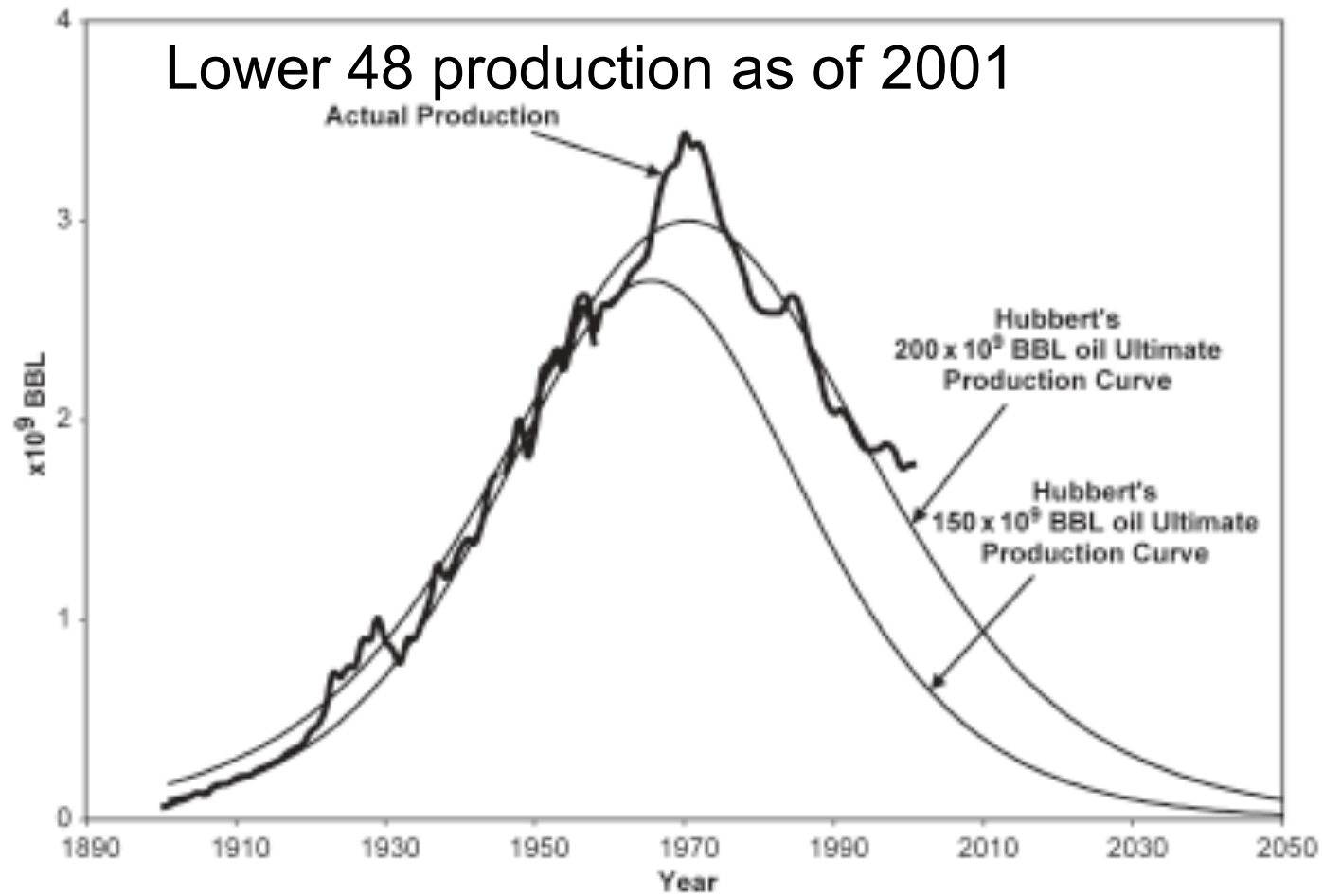


Fig. 4. US oil production (non-Alaska) showing both of Hubbert's 1956 predictions based on estimates of ultimate production of  $150 \times 10^9$  BBL and  $200 \times 10^9$  BBL oil. Production through 2001 (American Petroleum Institute 1959; Energy Information Administration 2003) is also shown.

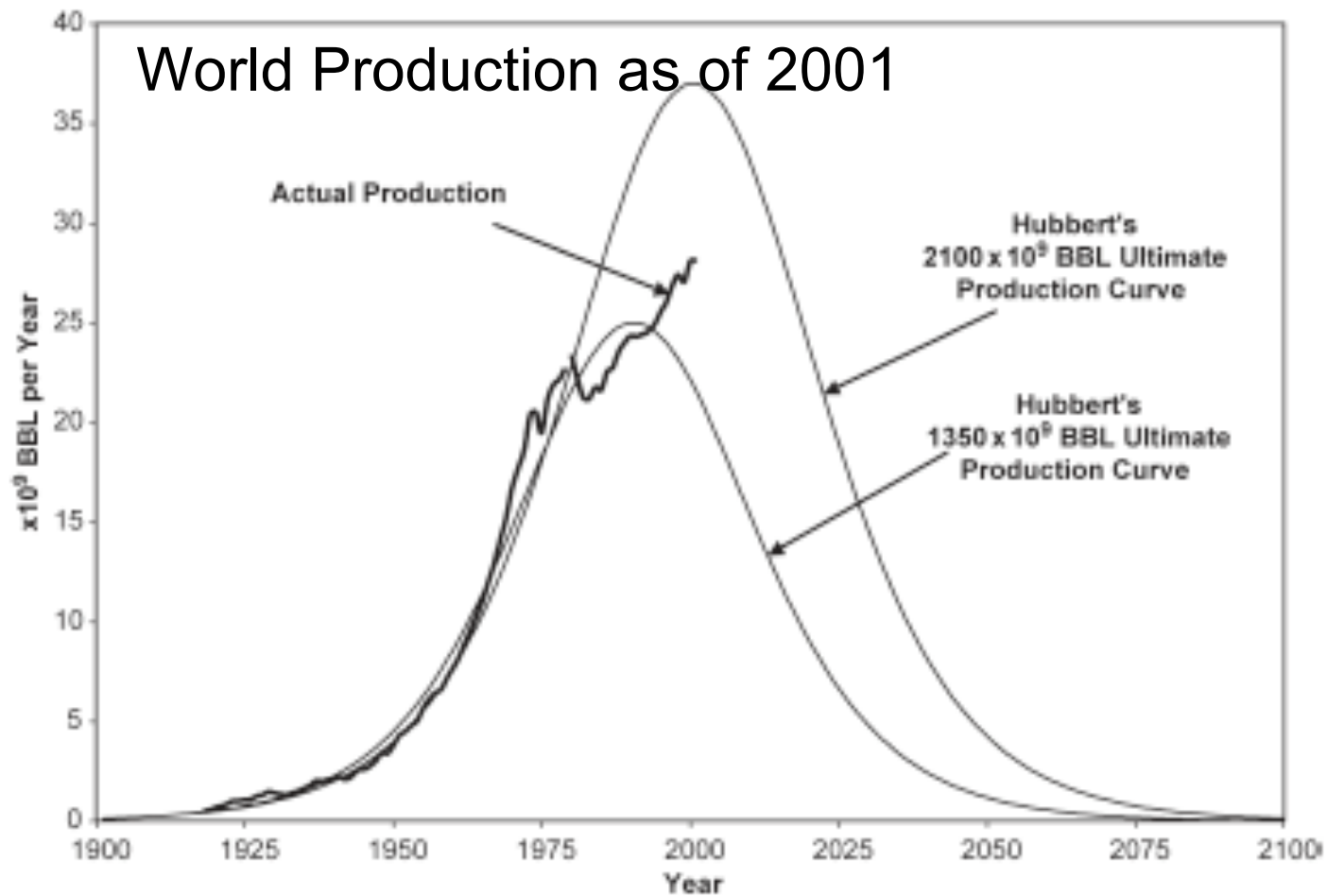
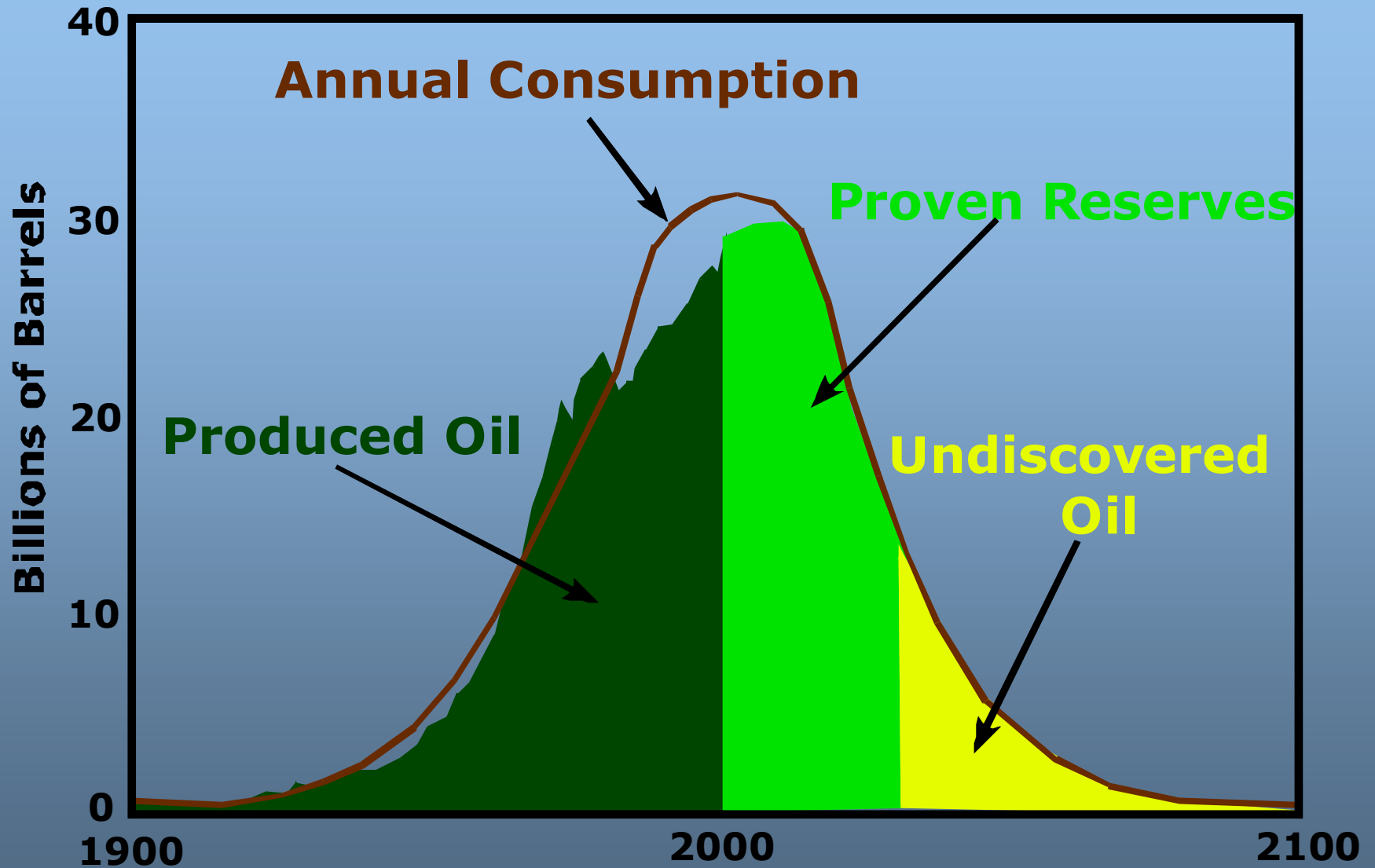


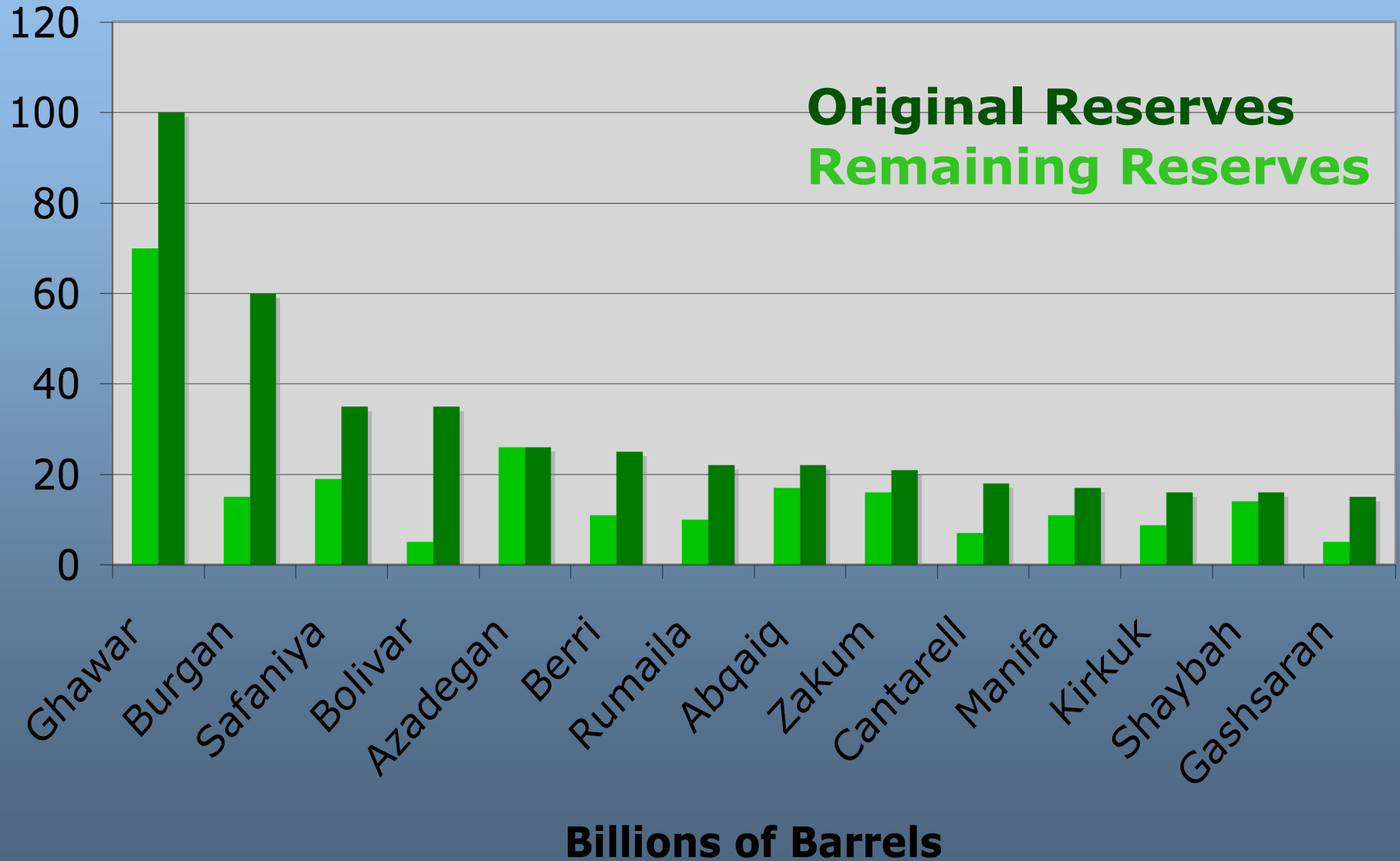
Fig. 6. World oil production showing Hubbert's 1969 predictions based on estimates of ultimate production of  $1350 \times 10^9$  BBL and  $2100 \times 10^9$  BBL oil. Production through 2001 (DeGolyer & MacNaughton 1988; Energy Information Administration 2002) is also shown.

# Hypothetical Hubbert Curve of Global Oil Consumption



## Proven Reserves

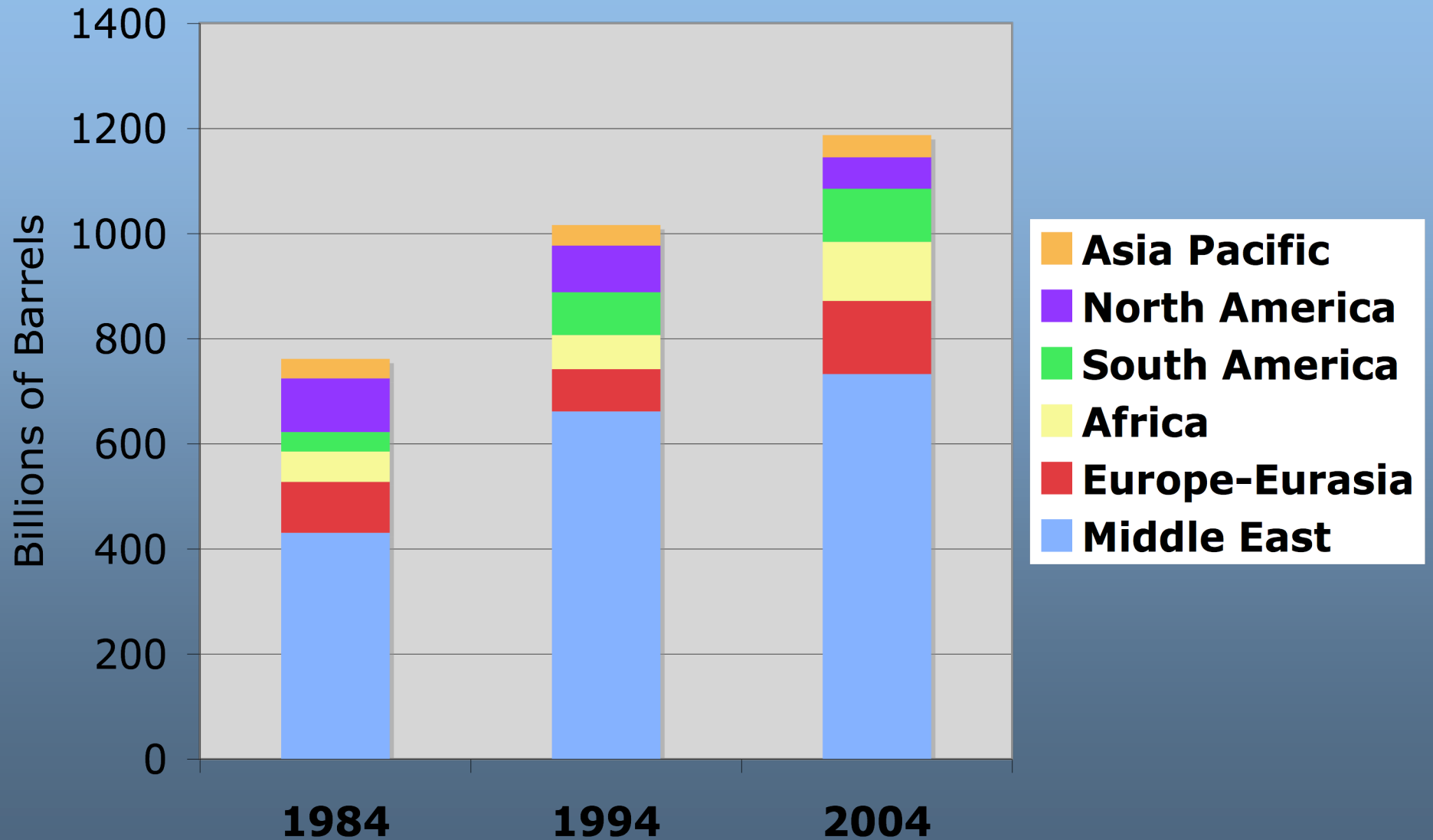
# Fourteen Largest Oil Fields





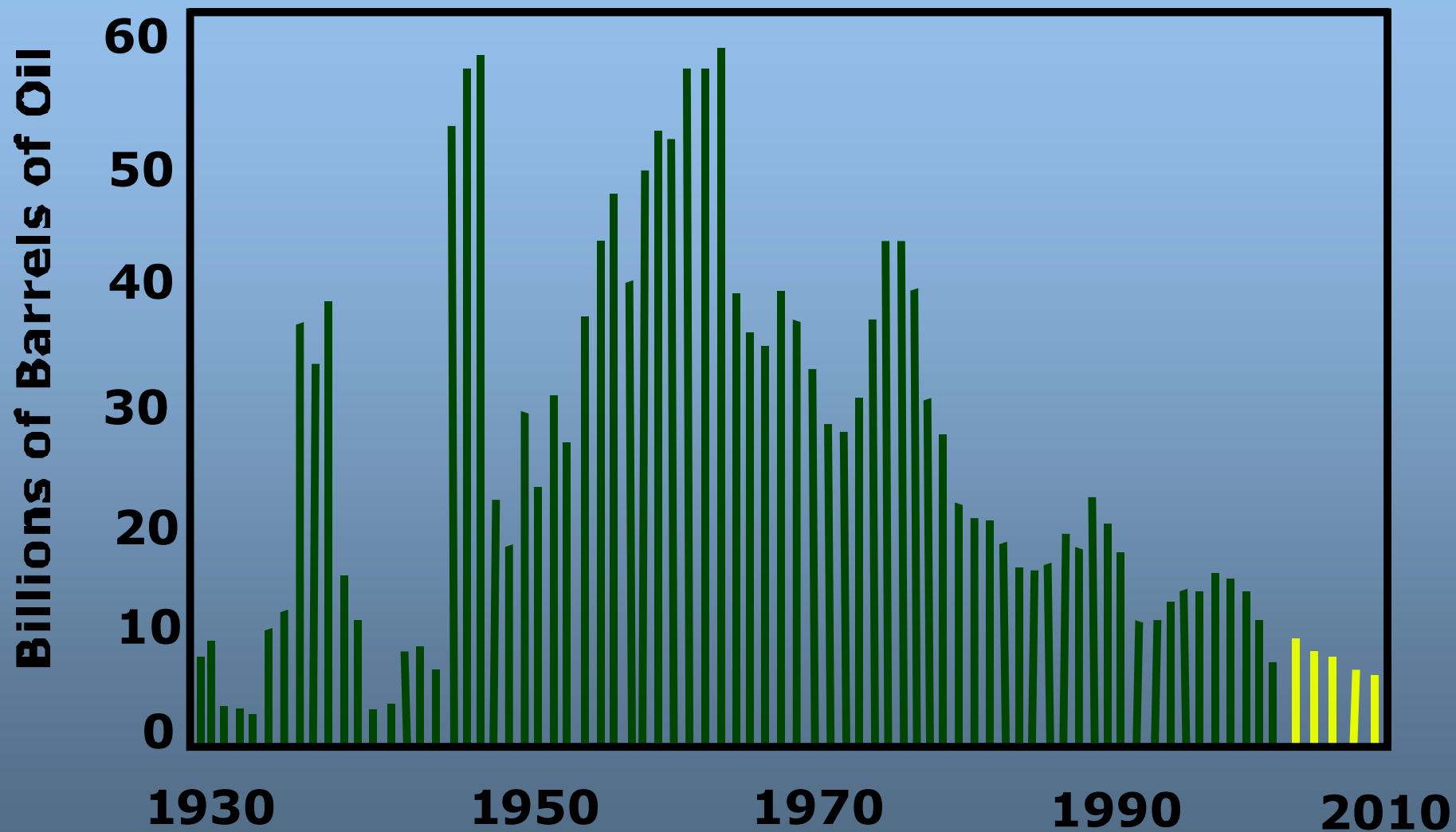
## Proven Reserves

# Global Oil Reserves



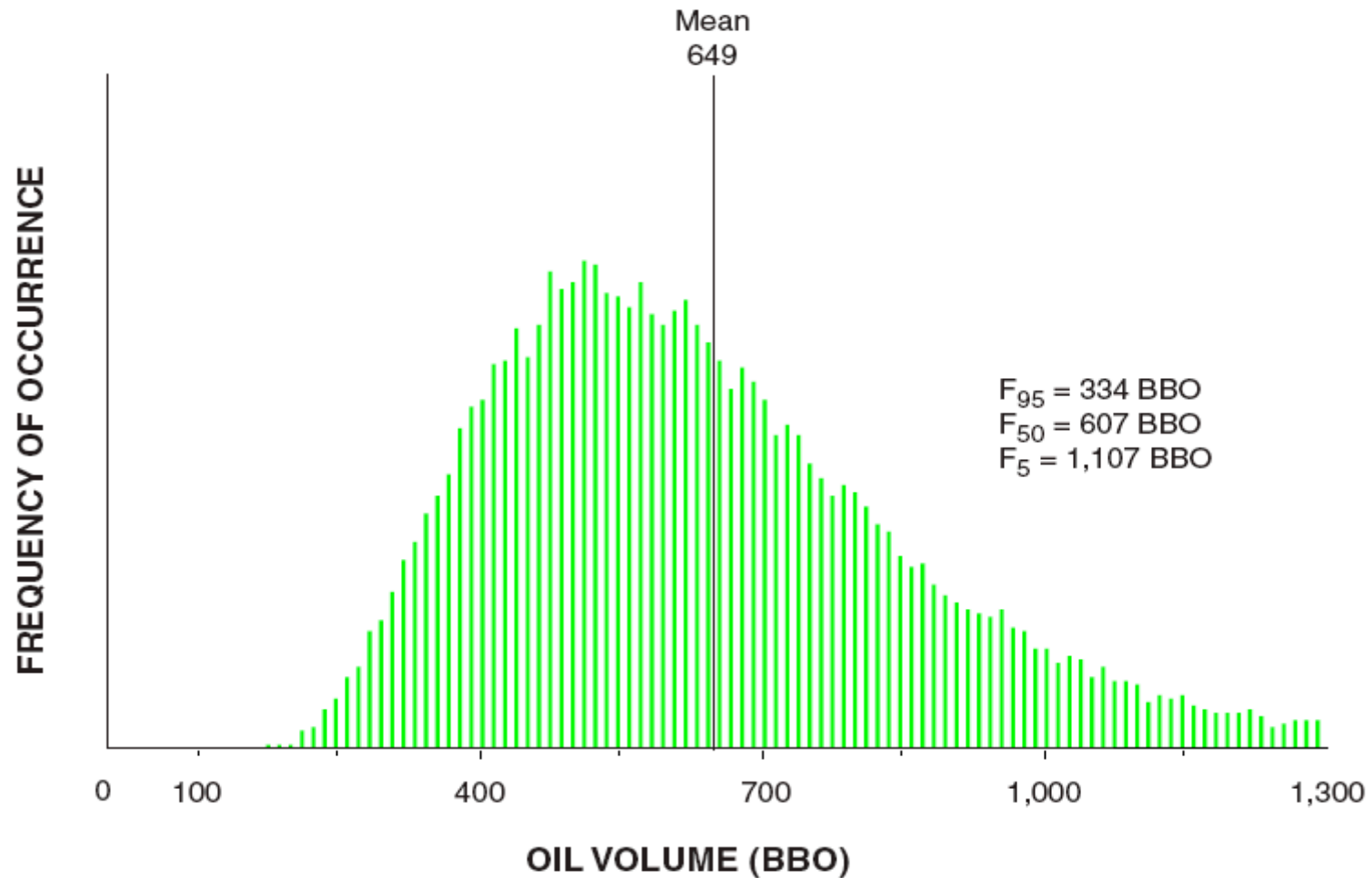
## Undiscovered Oil

# Oil Discoveries 1930 to 2010



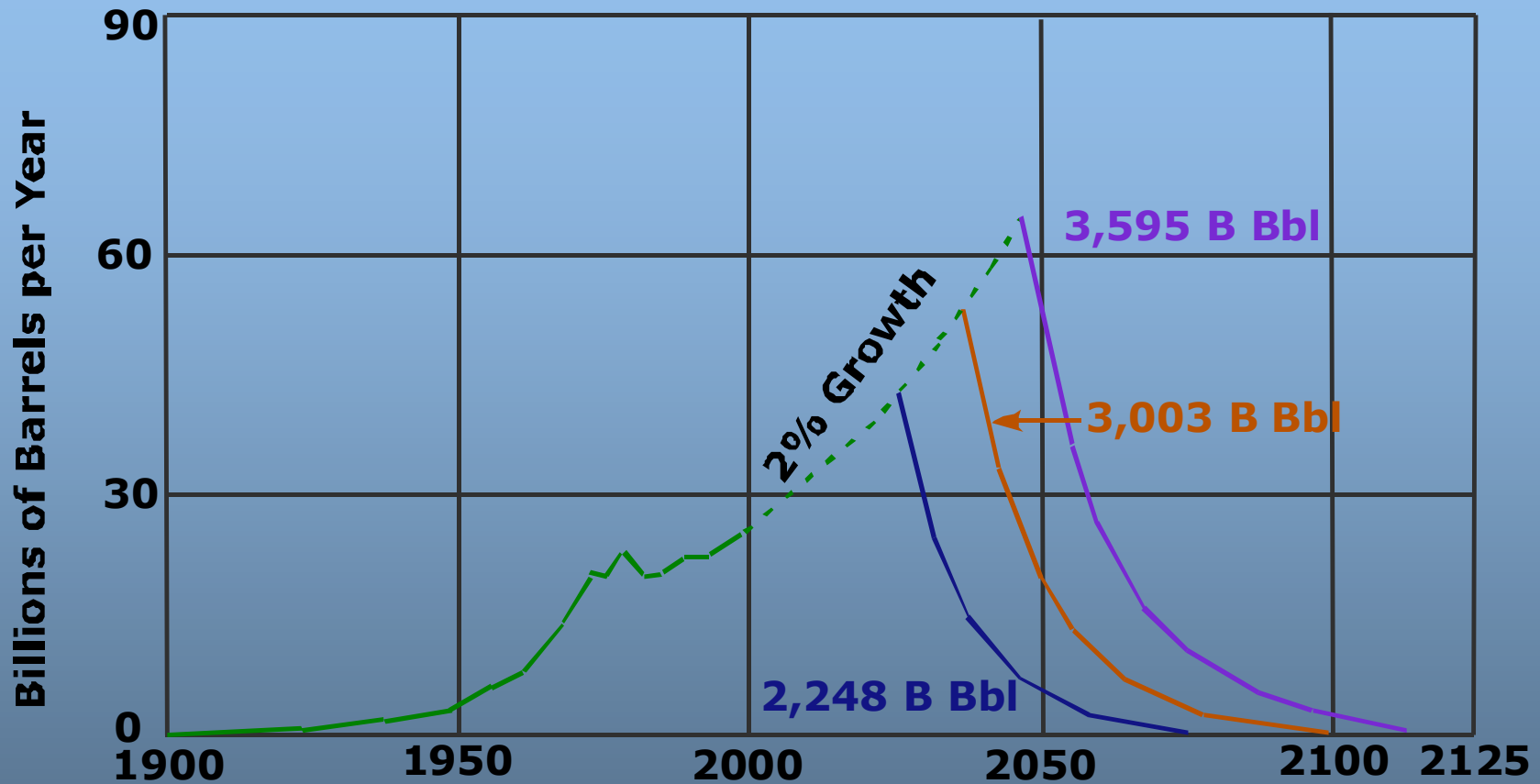
## Undiscovered Oil

### World Undiscovered Petroleum Resources (excluding U.S.) Oil

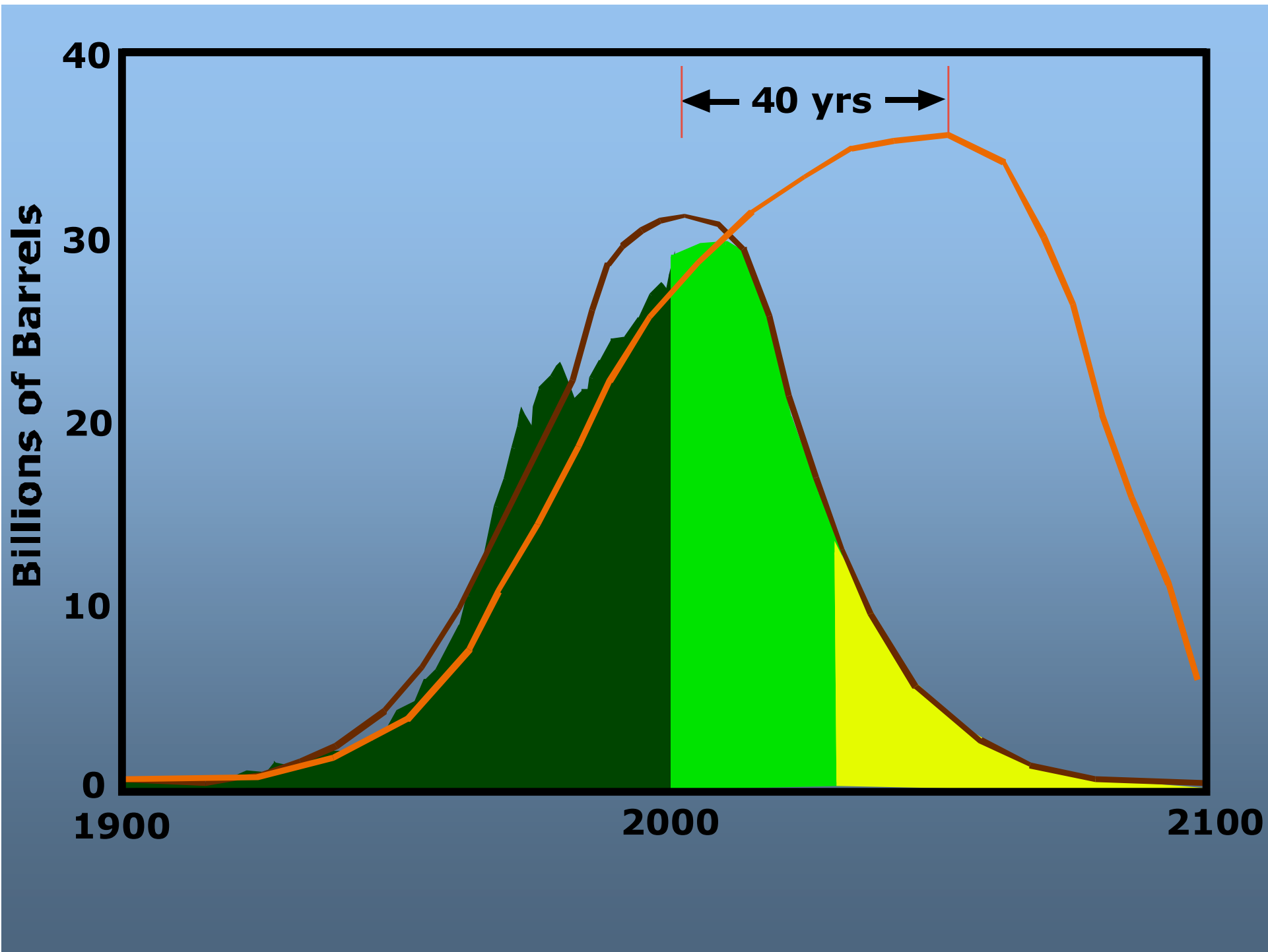


## Annual Consumption

### EIA World Conventional Oil Production Scenarios



Decline Resource/Production = 10



# Global Peak Oil Forecasts

Multidisciplinary task

Precise forecast problematic

Peak oil likely within 0 to 40 years

“All geology is local”  
Kevin Burke

“Oil is our patrimony”  
Bolivian geologist 1990

Some post-peak oil producing countries:

United States	United Kingdom
Indonesia	Egypt
Argentina	France
Iran	Russia

# Mexico

Produces 3.4 MMBOPD

Exports to US 1.6 MMBOPD

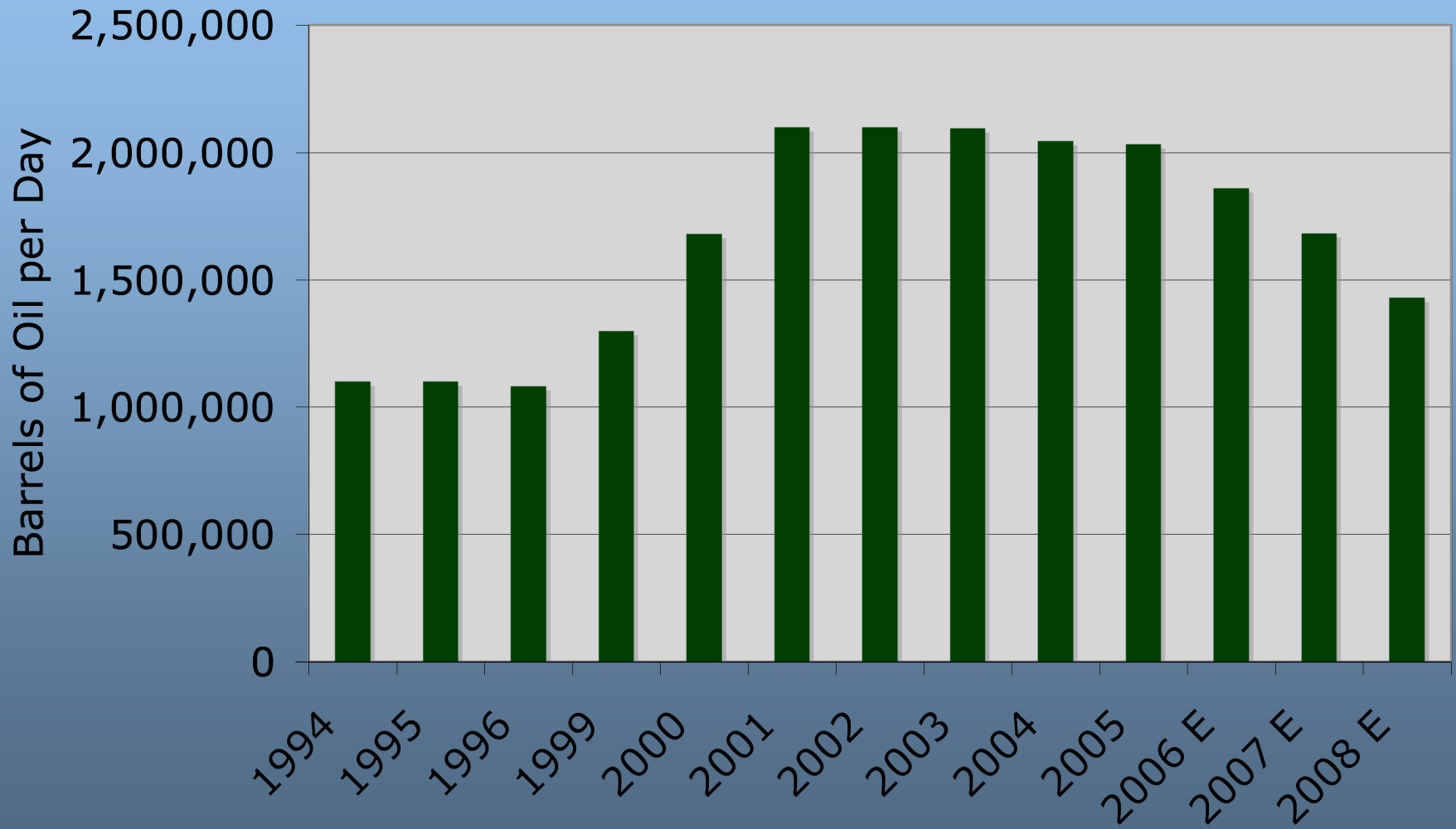
Pemex contributes 40% of state revenues

Cantarell contributes 57% of Pemex oil

Cantarell contributes 24% of state revenues



# Cantarell Oil Production

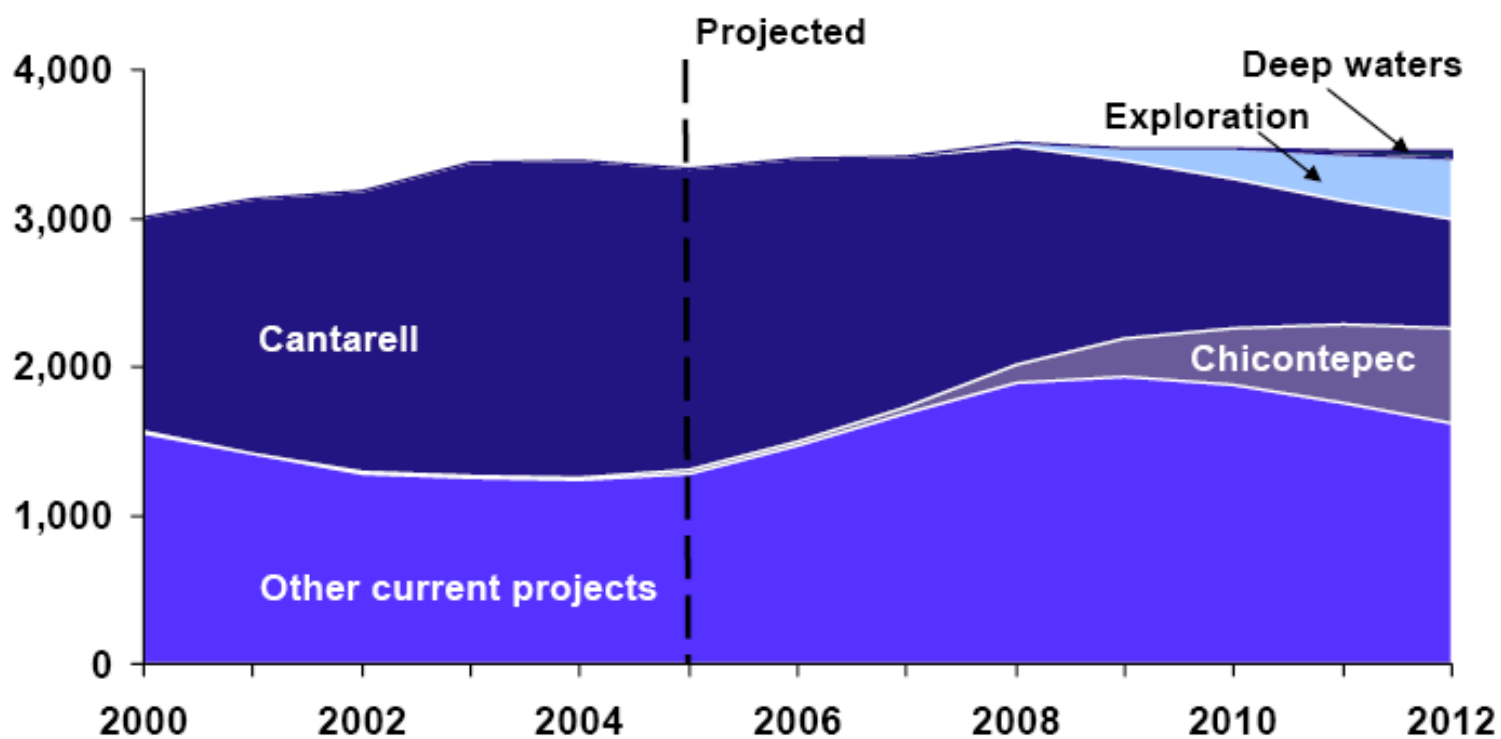


Source: Pemex

# Crude Oil Production Profile

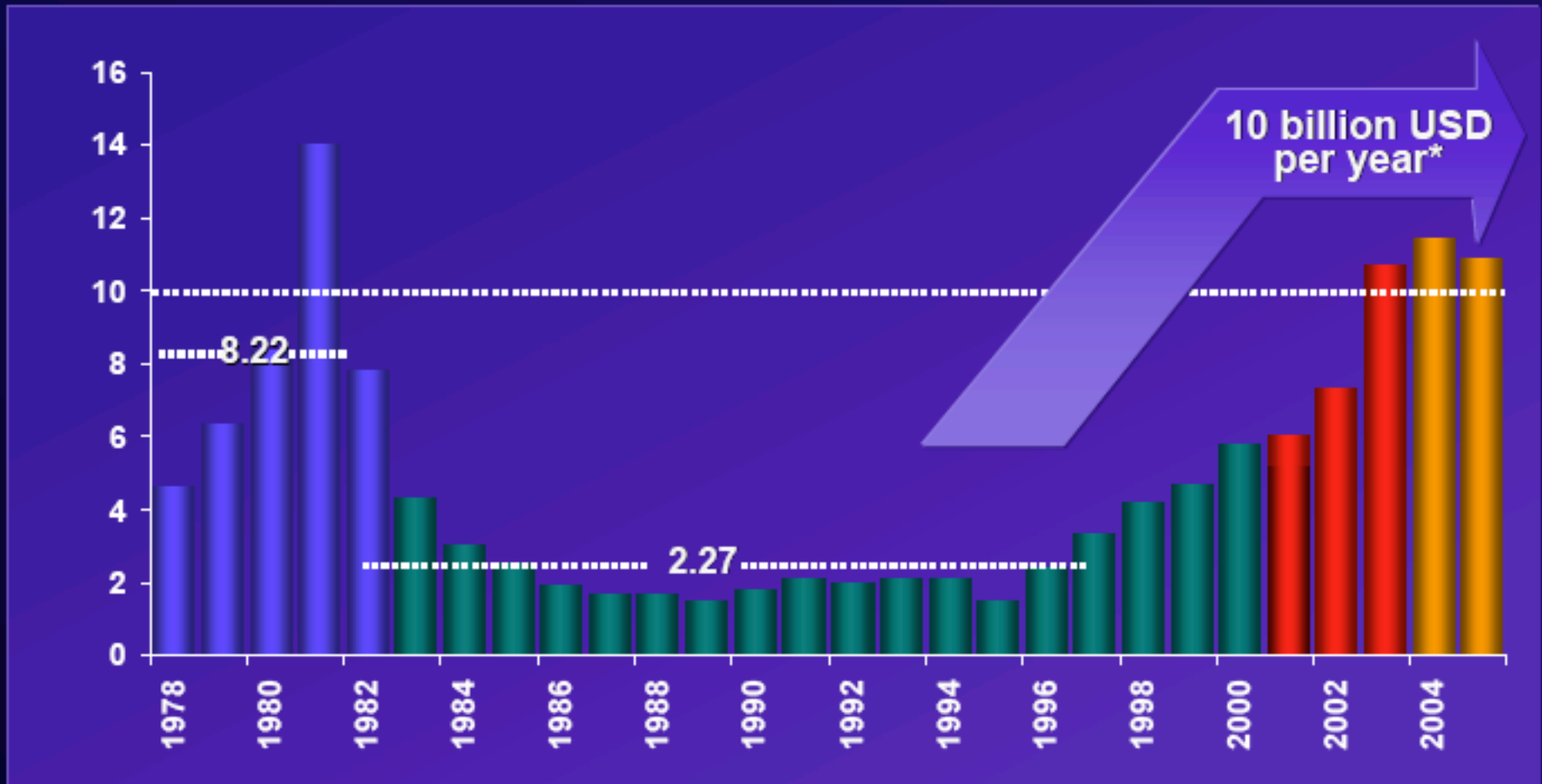


Oil production (Mbd)



# Pemex Investment level

Billion USD



\* Includes amortization of Pidiregas projects

Will the Mexican government  
sustain Pemex's capital program?

When will Pemex's oil production decline?

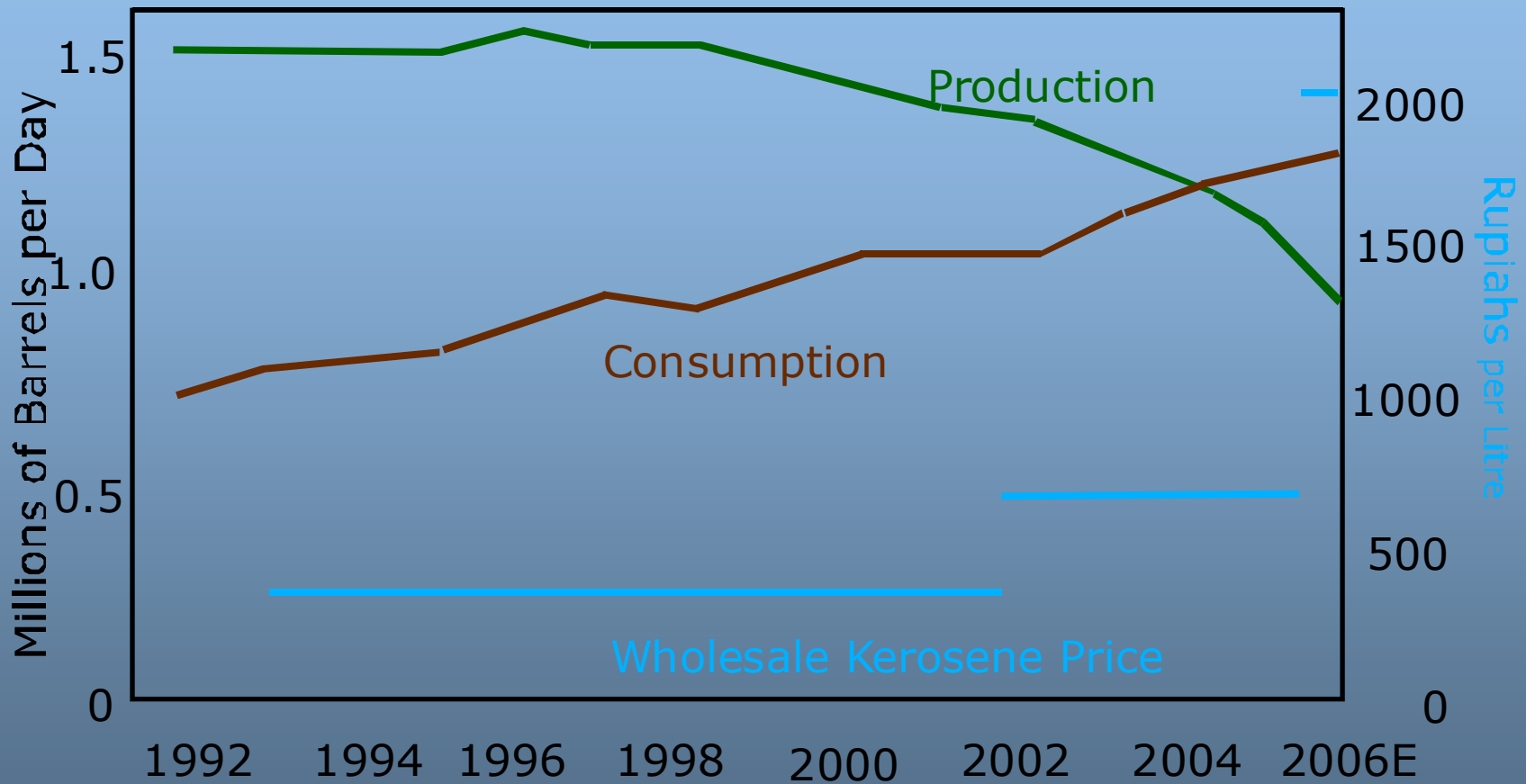
# Indonesia

Produces 1 MMBPD crude oil

Imports 0.250 MMBPD fuel

OPEC member since 1962

# Indonesian Oil Production and Consumption



Source: EIA

Can Indonesia attract exploration and production capital to stem declining production?

Can Indonesia bring its fuel market in line with global prices?

Will Indonesia compete with the US in the Pacific market?

# Western Europe Gas Production Peak

1948 Gas imports to Poland from Russia

1965 LNG imports to France and UK

1969 Gas imports to Austria from Russia

1974 Gas imports to Germany-Italy from Russia

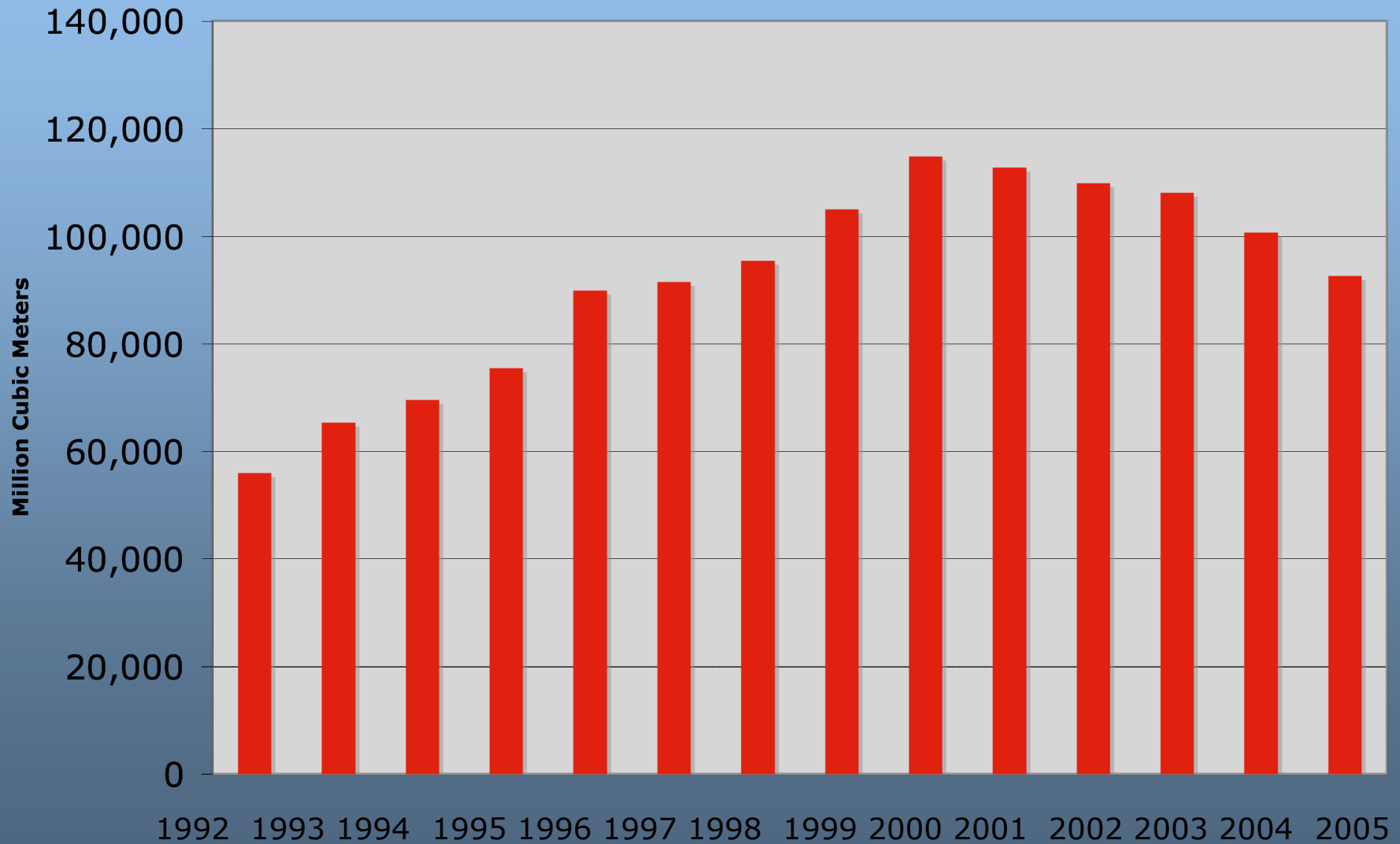
1978 LNG imports from Algeria

1983 Transmed pipeline Algeria to Italy

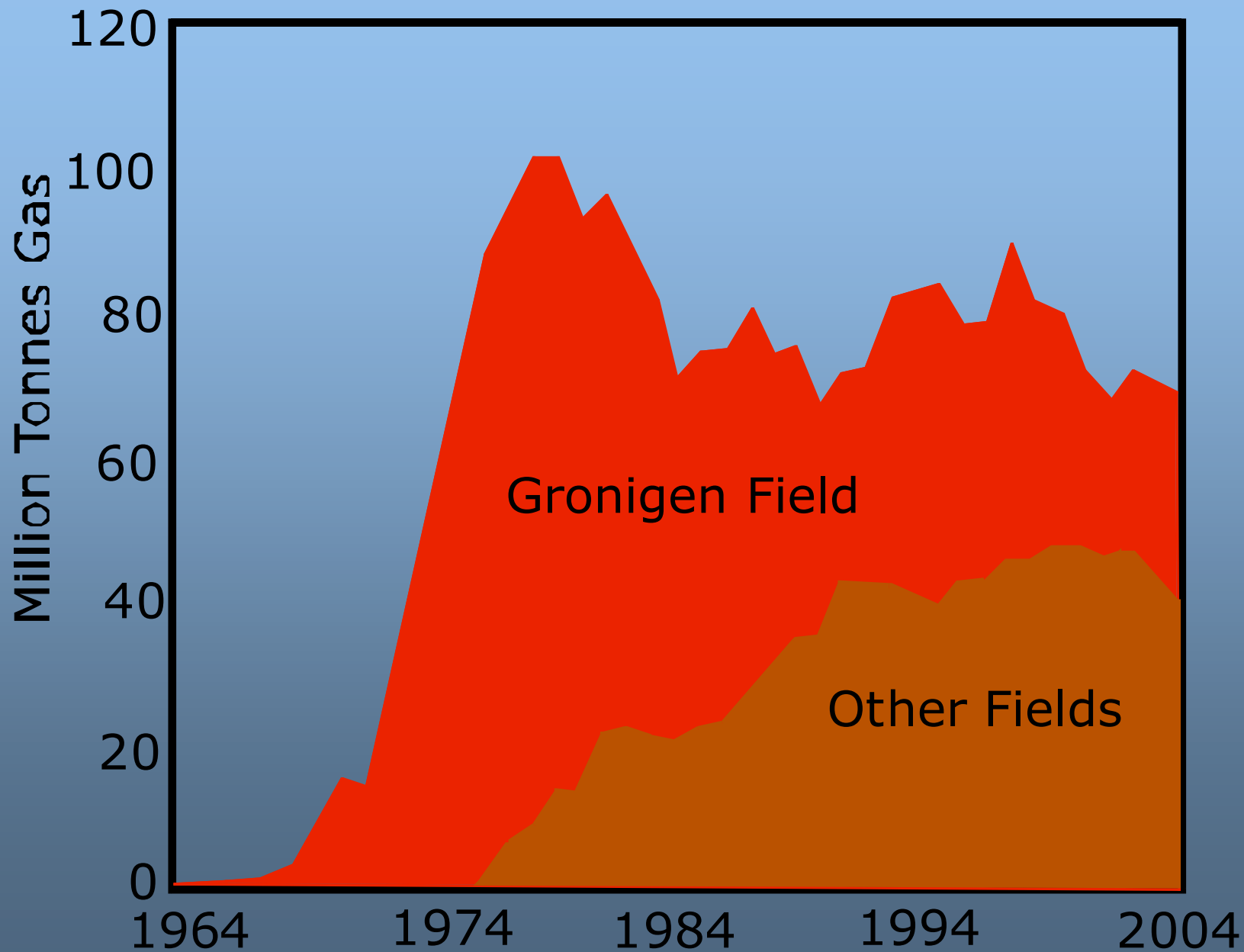
1996 Gaz Maghreb pipeline Algeria to Spain



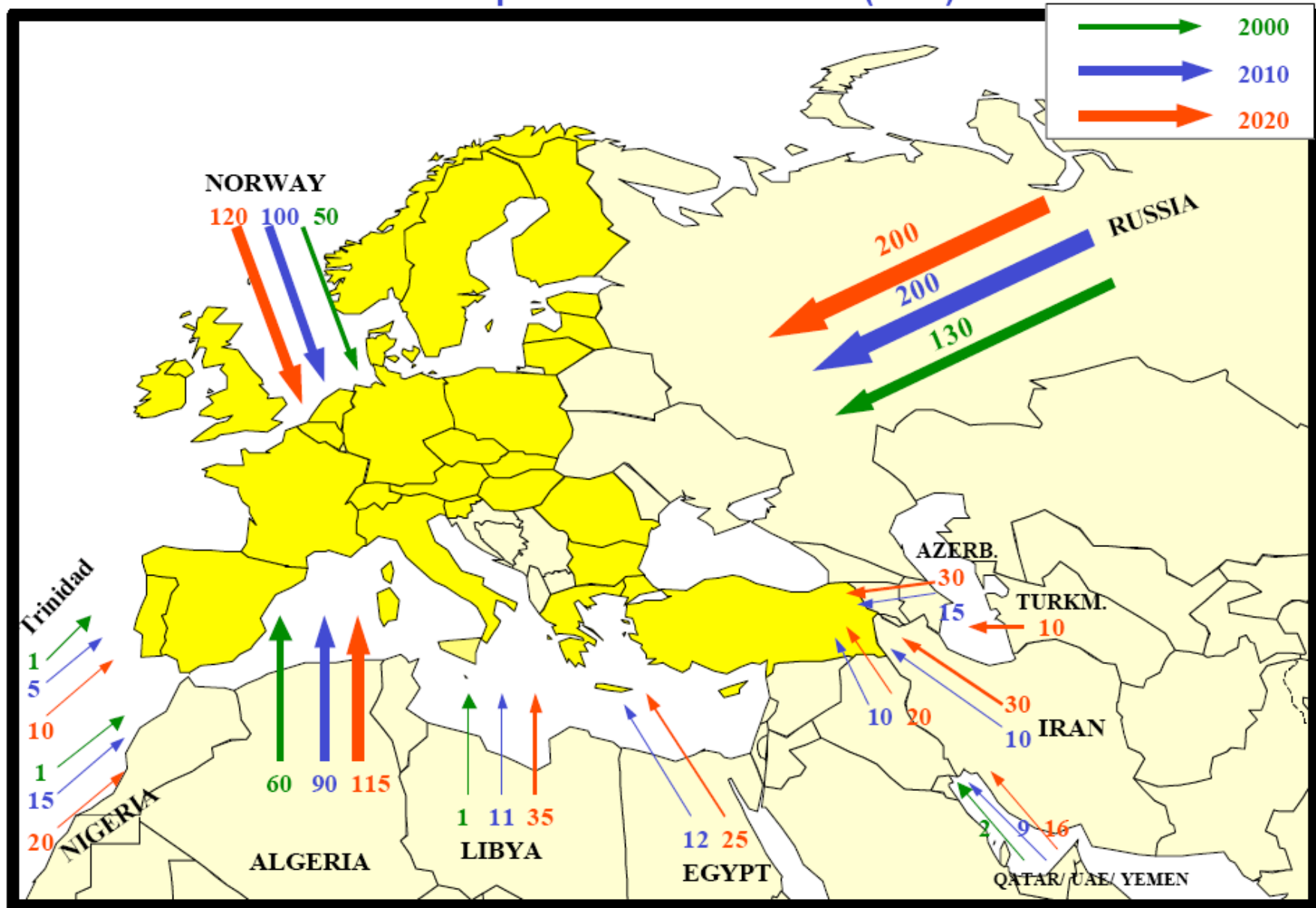
# UK Gas Production 1992 to 2005



# Dutch Gas Production



## Gas Export Potential to EU30 (Bcm)



Source: OME, 2001



Will Europe successfully diversify  
its gas supply?

Will Europe compete with the US in  
the Atlantic LNG market?

# Implications for US Energy Policy

Conserve limited resources

Support research for alternative energy sources

Recognize sovereignty of HC resources

Support global conservation and research

Do no harm to the markets

An aerial photograph of a mountain range. The foreground shows a valley with a winding river and several smaller peaks. In the middle ground, a large, prominent mountain peak is covered in snow. The background features more distant, lower mountains under a clear sky.

Acknowledgments:

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Thank You

