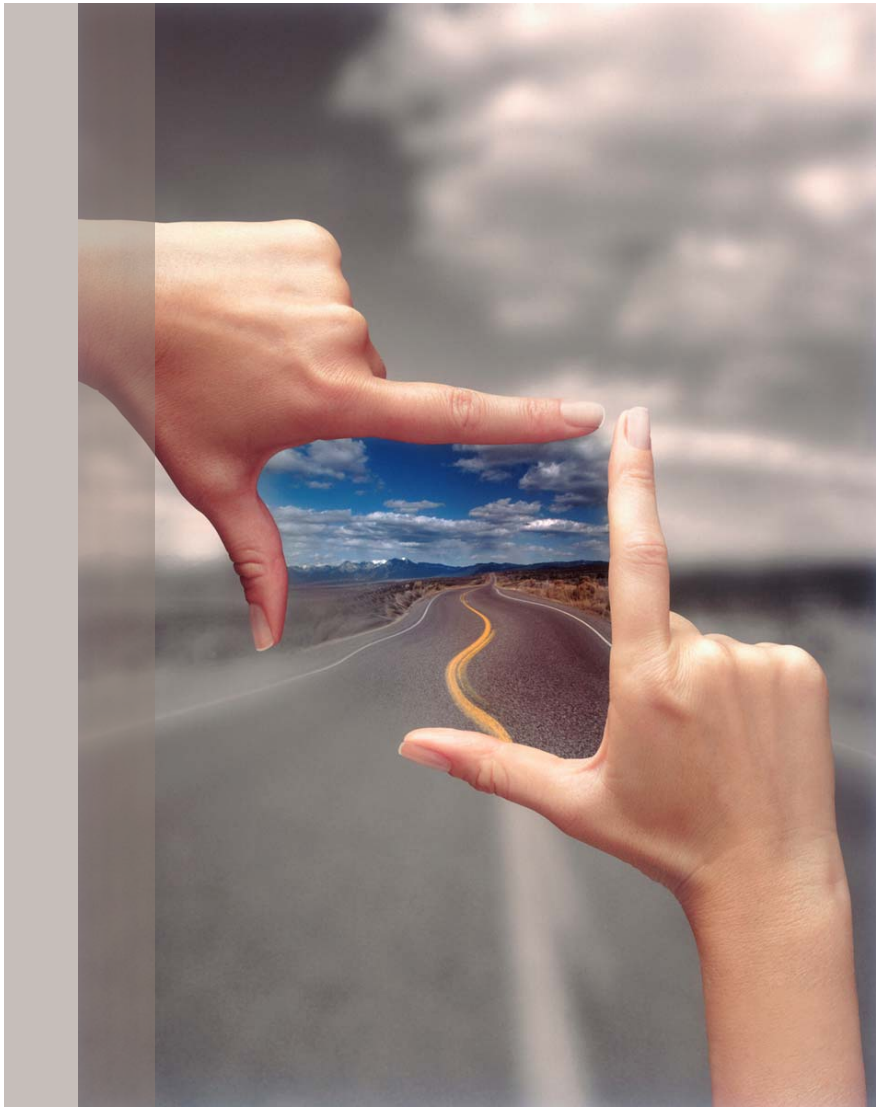
Integrating Biofuels into the Energy Industry

Biofuels and the Energy Industry

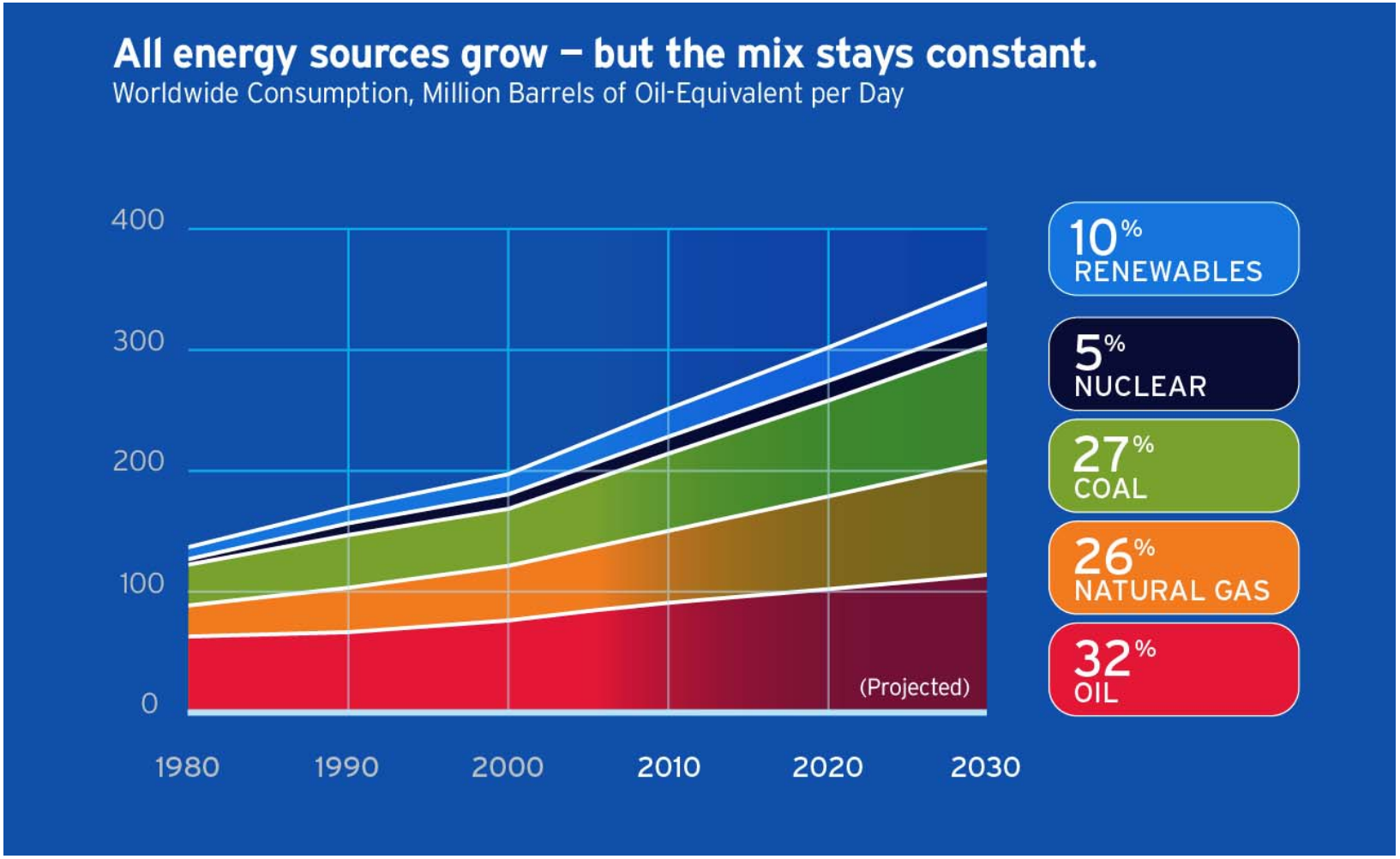
- Global Perspectives
- Biofuel Drivers
- Biofuel Success Factors
- Chevron's Actions



Global Energy Perspectives

- Grow energy demand globally, especially in China, India and Latin America
- Increase competition and investments for resources
- Develop cleaner fuels and technologies
- Improve energy efficiency
- Diversifying supply & integrating sustainable resources
- Increasing expectations surrounding climate change

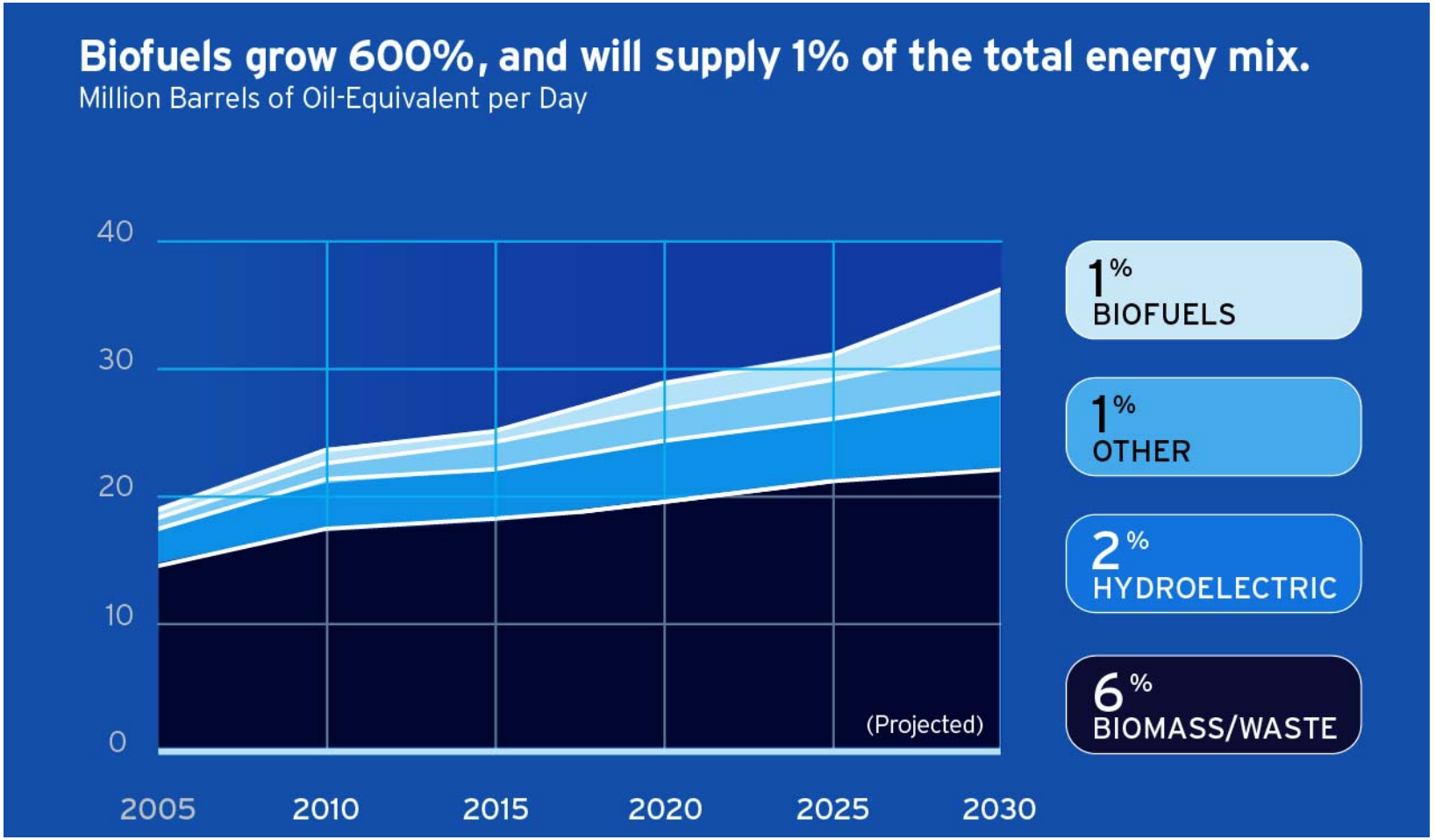
Worldwide Energy Consumption



Source: U.S. DOE/EIA Energy Annual 2006

Renewables Will Double in 25 Years

And we will still need fossil fuels to satisfy 85% of consumption



Source: U.S. DOE/EIA Energy Annual 2006

Biofuels Success Factors

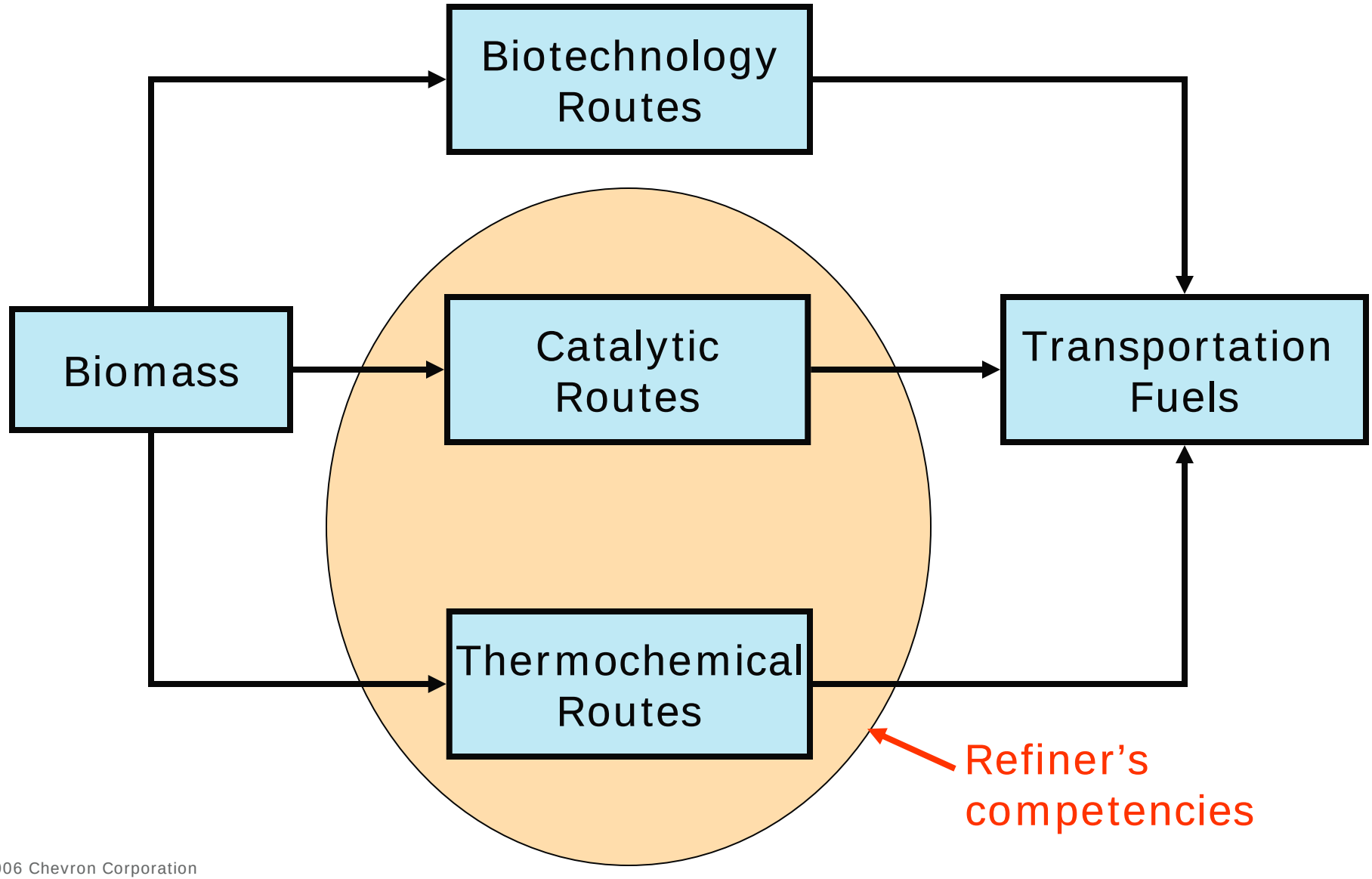
✓ **Industrial-scale infrastructure**

✓ **2nd generation production technology**

✓ **Large, concentrated supplies of feedstock**

***..plus*, sustainable business models**

Conversion Technology Pathways



The Fuel Supply System

- Capital intensive
- Technology intensive
- Highly-integrated systems

- Very long-lived assets
- Infrastructure characteristics
- Intersects global economics and politics

Deployment of New Fuel Technology at Scale

~ 10 years

Bench Top	Pilot Plant	Experimental Plant	World-scale Commercial Plant
$ Millions	$ 10's Millions	$ 100's Millions	$ Billions
			
<.01 B/D	~ 1 B/D	~1,000 B/D	~100,000 B/D

Illustrative example

Biofuels Objectives

- Build a biofuels business of scale for Chevron as part of a strategic portfolio of diversification of feedstock and fuel supply
- Improve the performance of first-generation biofuels product supply:
  - Quality assurance at the level of current fuel standards
  - “Industrial-scale” infrastructure
- Develop next-generation processing technology to significantly expand the scale and choice of feedstock

Finding and Encouraging the Best Options...Enabling the Winners

- There is no single solution
  - Issues of dependency, reliability of supply, environmental footprint and cost apply to all fuels to some degree
- All economic fuels, plus conservation, will be needed to meet future demand
  - Consumers have the means to conserve and are beginning to respond
  - Market-based competition among technologies and fuels should not be inhibited
- Allow time for technology to advance
  - New technologies must offer tangible benefits to consumers and real-world well-to-wheels benefits to the environment
  - Discussions like this are a good way to make progress