

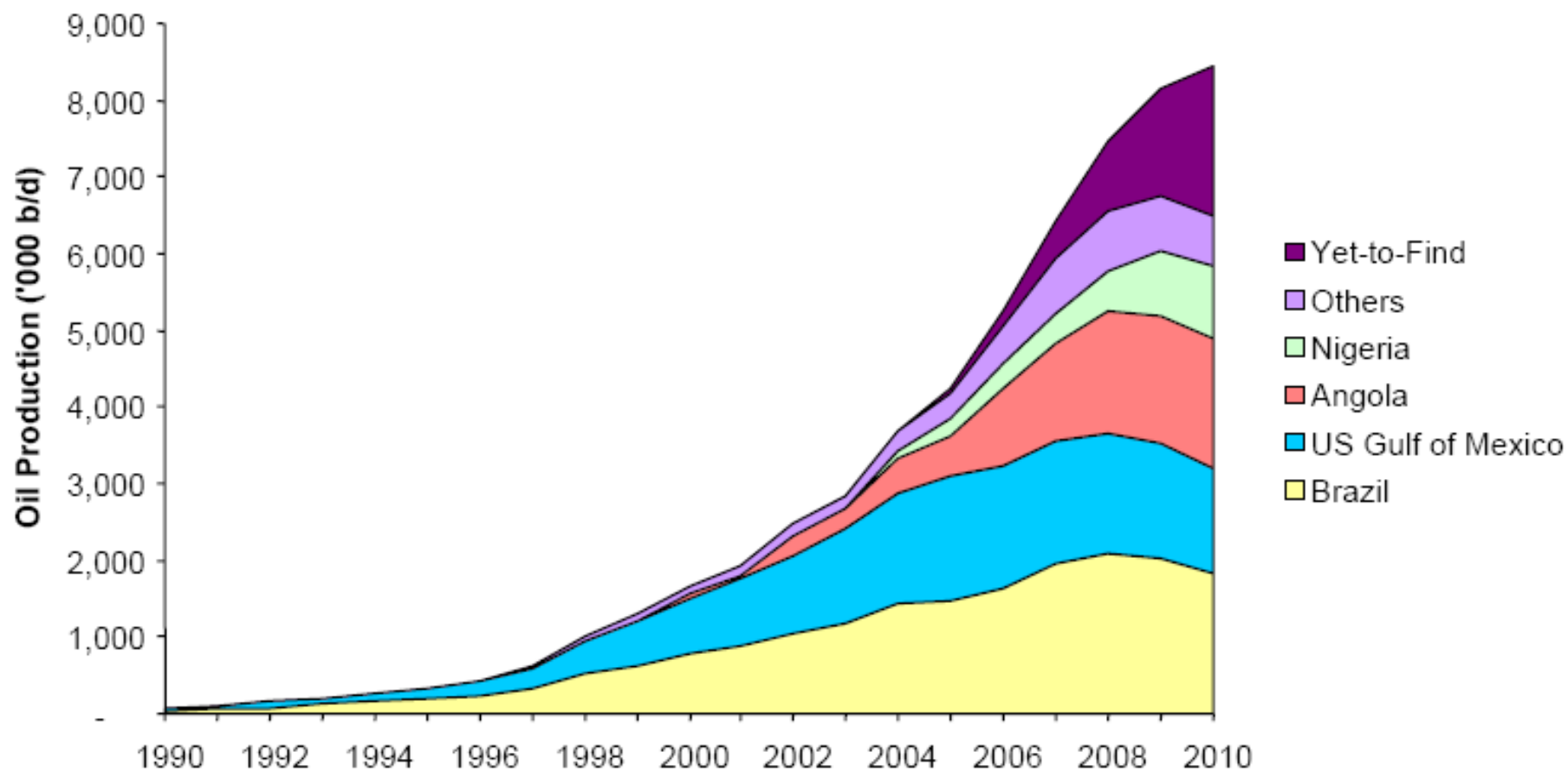


How Challenging is Deepwater: An Overview

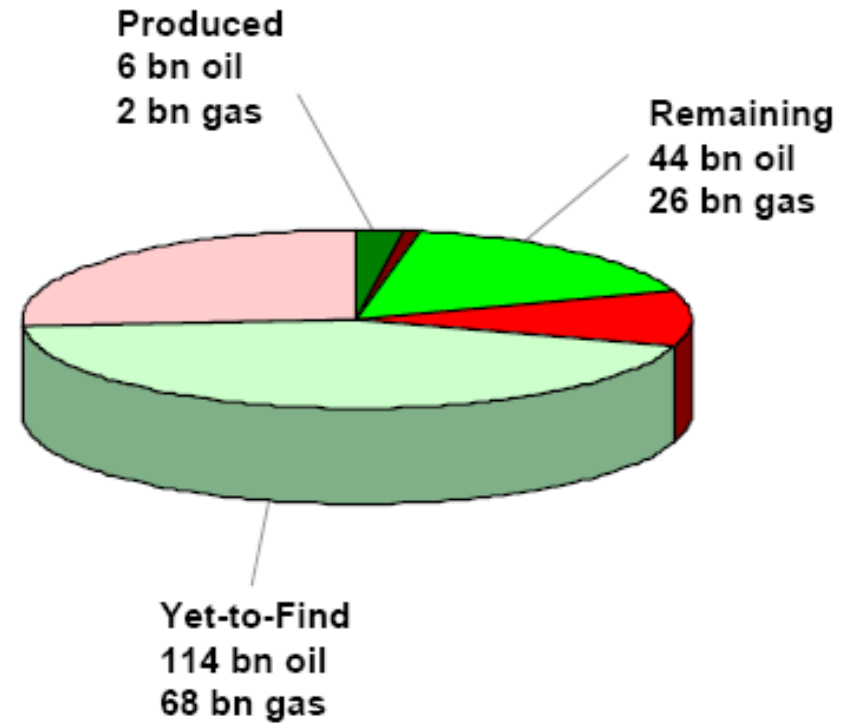
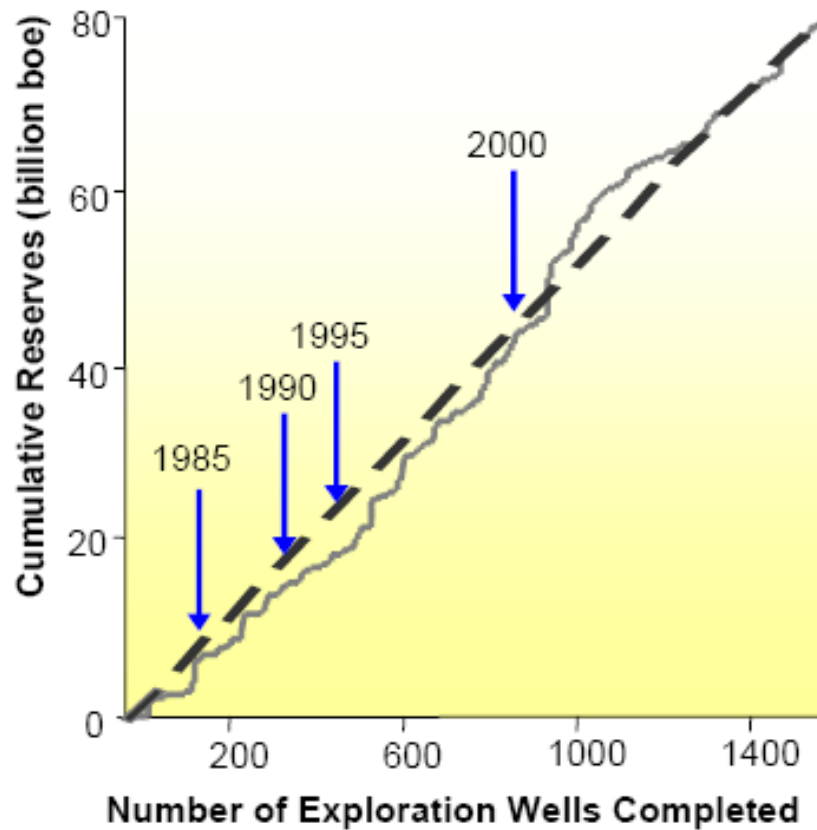
- ❑ The importance of deepwater to oil companies portfolios
- ❑ Potential importance of deepwater to Mexico's future production
- ❑ Finding and Development Timelines
- ❑ Other challenges
- ❑ Industry Conventional Wisdom
- ❑ Conclusion

The importance of deepwater to oil companies portfolios

Deepwater is a key source of new oil production

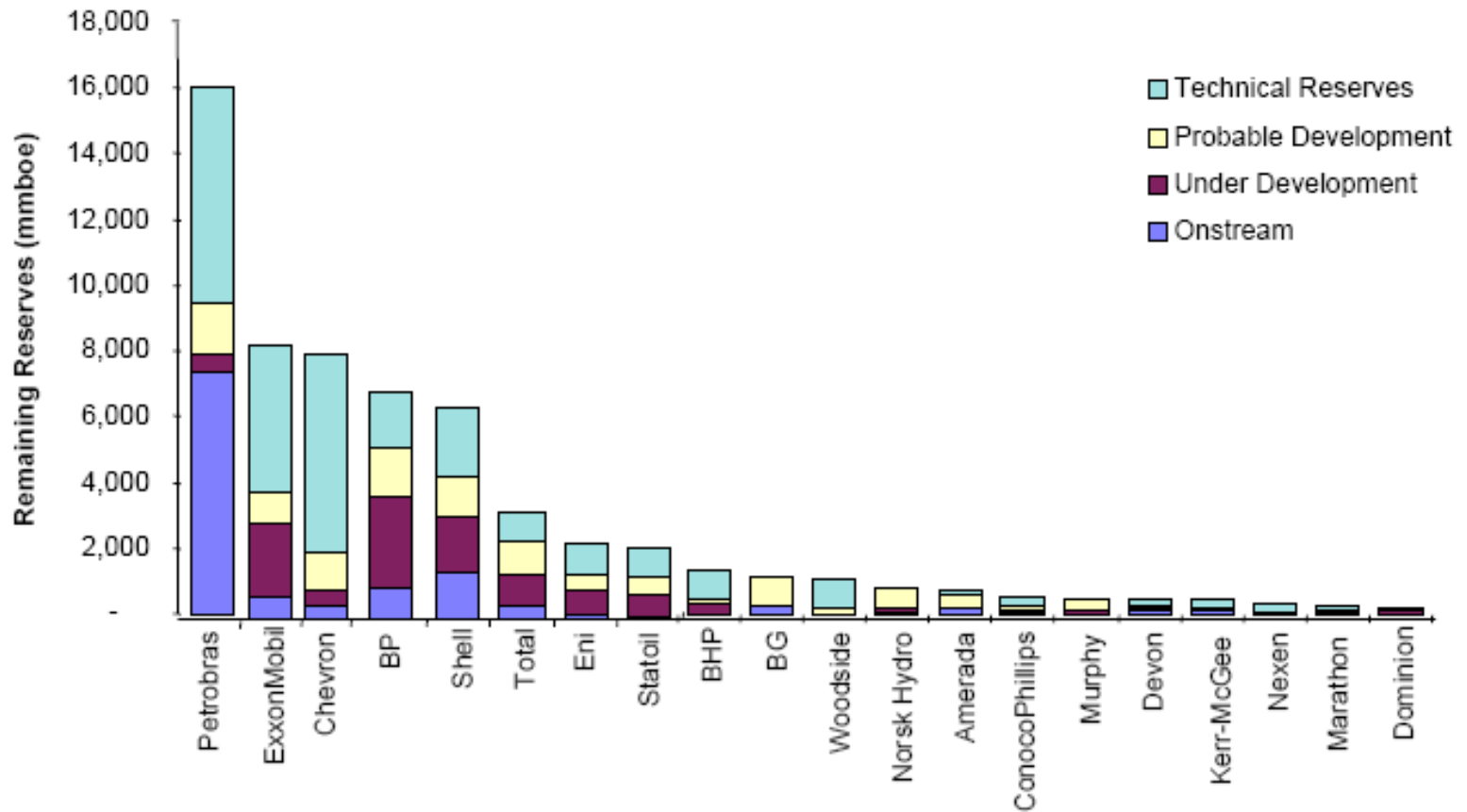


There is vast remaining potential in deepwater



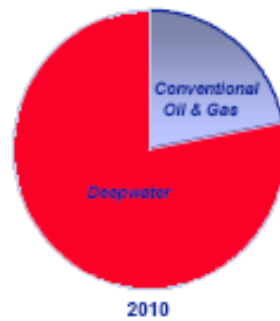
Source: *The Future of Deepwater*
Wood Mackenzie & Fugro Robertson

Leading deepwater companies by reserves

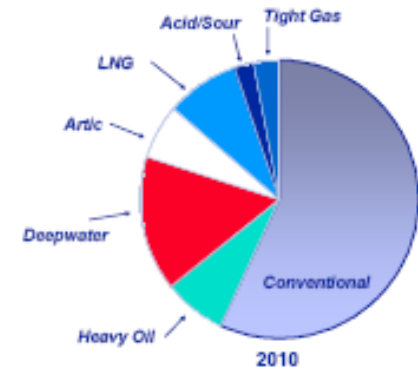
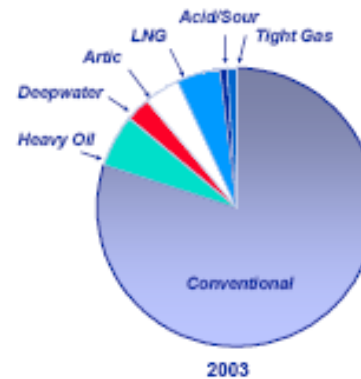


Increasing percentage of deepwater production

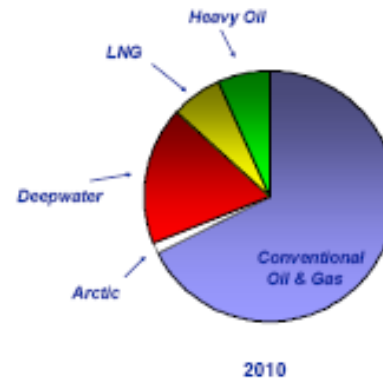
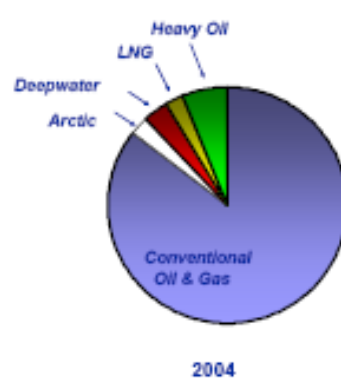
Petrobras – Production Portfolio



ExxonMobil - Production Portfolio

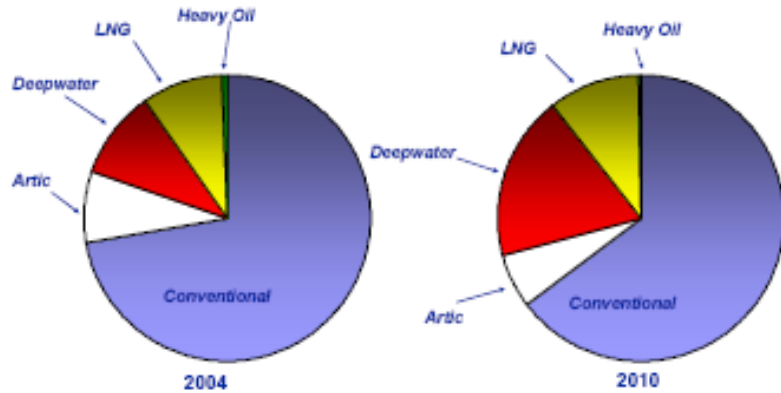


Chevron – Production Portfolio

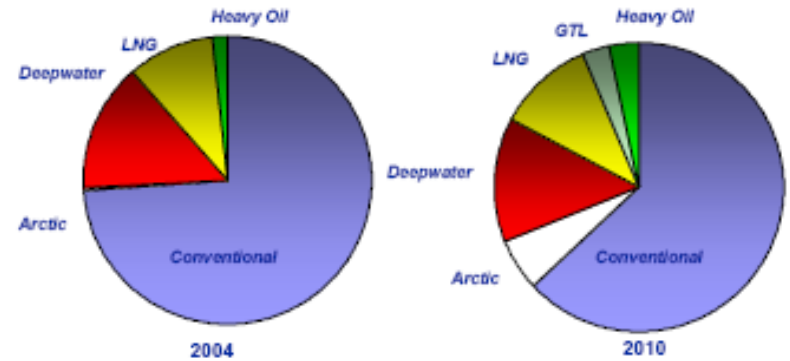


Increasing percentage of deepwater production

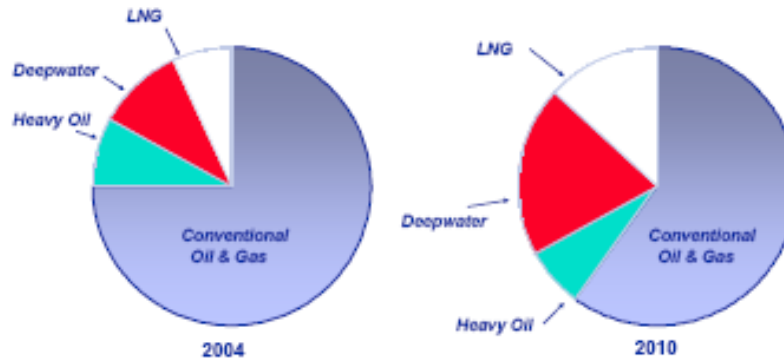
BP – Production Portfolio



Shell – Production Portfolio



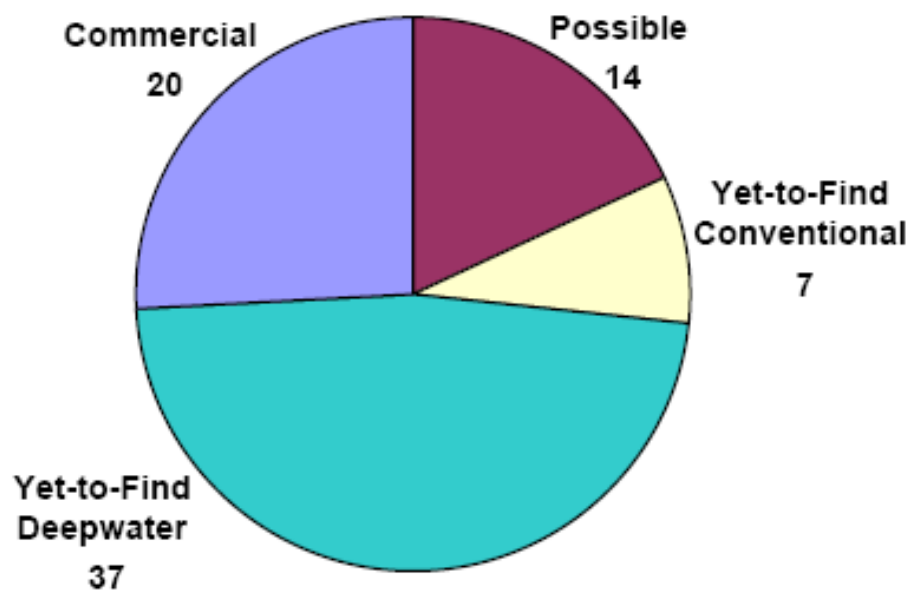
Total – Production Portfolio



Potential importance of deepwater to Mexico's future production

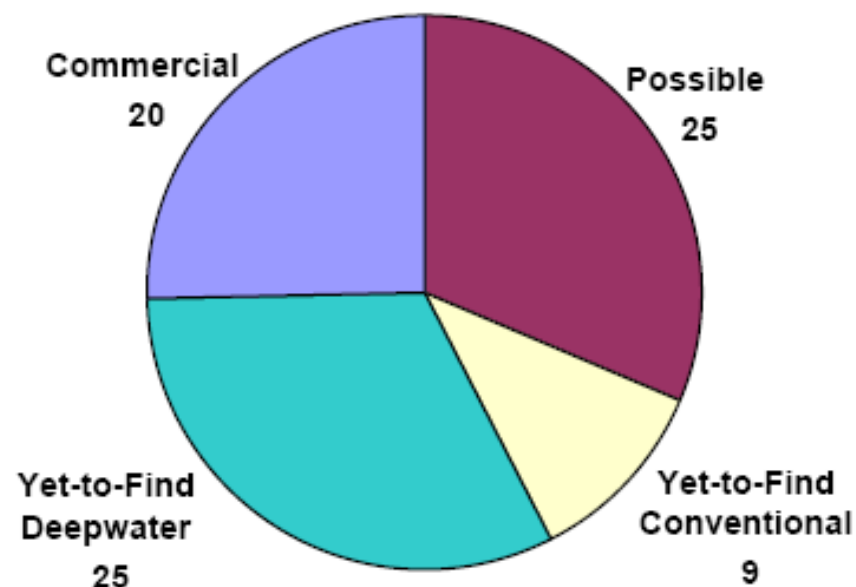
Mexico's Oil and Gas Resource Potential

Oil (billion barrels)



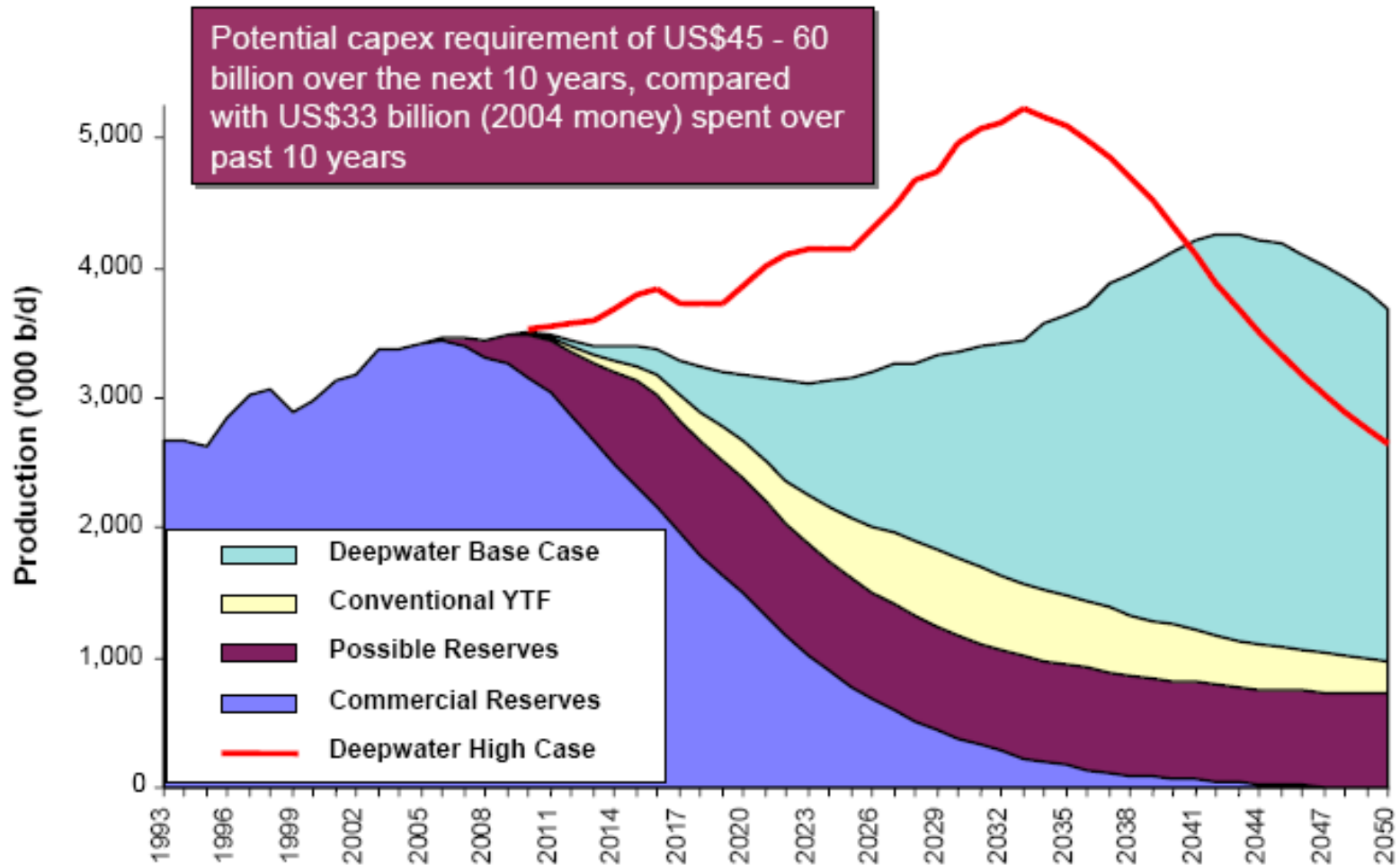
Total Oil Resource: 78 bn.bbls

Sales Gas (tcf)

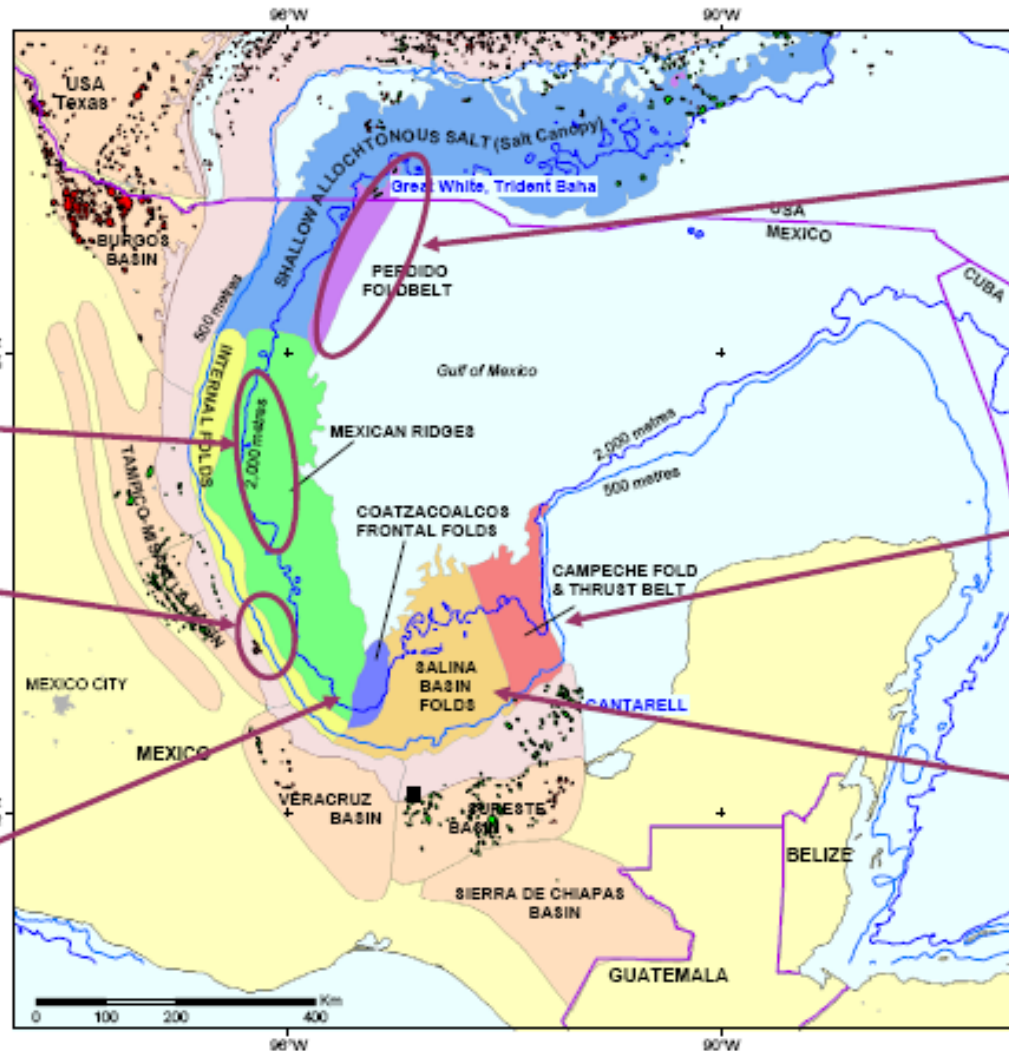


Total Sales Gas Resource: 80 tcf

Long-term Mexican oil production forecast



Mexico's Deepwater Provinces



Mexican Ridges
(1,500-2,000m; light oil)

Internal Folds
(500-1,500m; gas-prone Lankahuasa Deep play)

Coatzacoalcos Frontal Folds (> 1,500m; light oil?)

Perdido Foldbelt
(2,000-3,000m; light oil; share infrastructure with USA?)

Campeche Fold & Thrust Belt
(500-2,000m; heavy oil; first well, Nab-1, drilled Sept 2004)

Salina Basin Folds
(> 1,500m; light oil?)

Finding and Development Timelines

Deepwater Finding and Development Timelines

Define the Opportunity
Work up the prospects

1 to 3 years

- Shoot seismic across areas of interest
- Seismic processing, mapping
- Move opportunity from lead to prospect
- Position and contract deepwater drilling unit – lead time 1-2 years

Plan and execute the Exploration Phase

12-18months

- Plan detailed drilling programme
- Seabed surveys, riser analysis
- HSE, technical and operational integrity plans
- Contract services
- Drill and test wells
- Analyse results

In the event of success - appraise

12-18months

- Plan detailed appraisal programme
- Seabed surveys, riser analysis
- HSE, technical and operational integrity plans
- Contract services
- Drill and test wells
- Analyse results

Plan the Development, front end engineering, procurement

2 years

- Draw up alternative development options
- Conceptual engineering and costing of options
- Choose option
- Sanction process
- Front end engineering and design
- Procurement and ordering of long lead items
- Contract deepwater drilling units to pre-drill wells

Build kit – pre drill wells, commission

2-4 years

- Build and install production and processing equipment, subsea kit etc
- Pre-drill wells
- Build required infrastructure – pipelines etc
- Tie-back wells
- Commission

Production

- Operate

Angola Deepwater Finding and Development Timelines



Other Challenges

Increasing Complexity and Risk

- **Project Management**
- **Exploration risk mitigation and seismic imaging**
- **Drilling operational and safety challenges**
- **Underwater currents and riser integrity**
- **Surface casing collapse due to overcharged aquifers/gas charged sands**
- **Cementing of surface casing strings due to slow cement hydration**
- **Geomechanical challenges due to mobile and pressured salt formations**
- **Narrow pore pressure and fracture gradient windows (lost circulation)**

Increasing Complexity and Risk

- **Subsea equipment reliability**
- **Management of water production (intelligent completions)**
- **Access to satellite reserves and multiphase flow**
- **Modelling of deepwater reservoirs (characterisation/flow modelling)**
- **Sulphate Scale management and control**
- **Gas Hydrates**
- **GeoHazards (slumping and turbidity currents)**
- **Distance from shore – emergency response/oil spills**

Industry Conventional Wisdom

Industry Conventional Wisdom

Contractors

- Drilling Contractors have extensive experience in deepwater
- Oil Construction Companies can build “kit” for deepwater
- Oil Services companies are developing some of the required technology

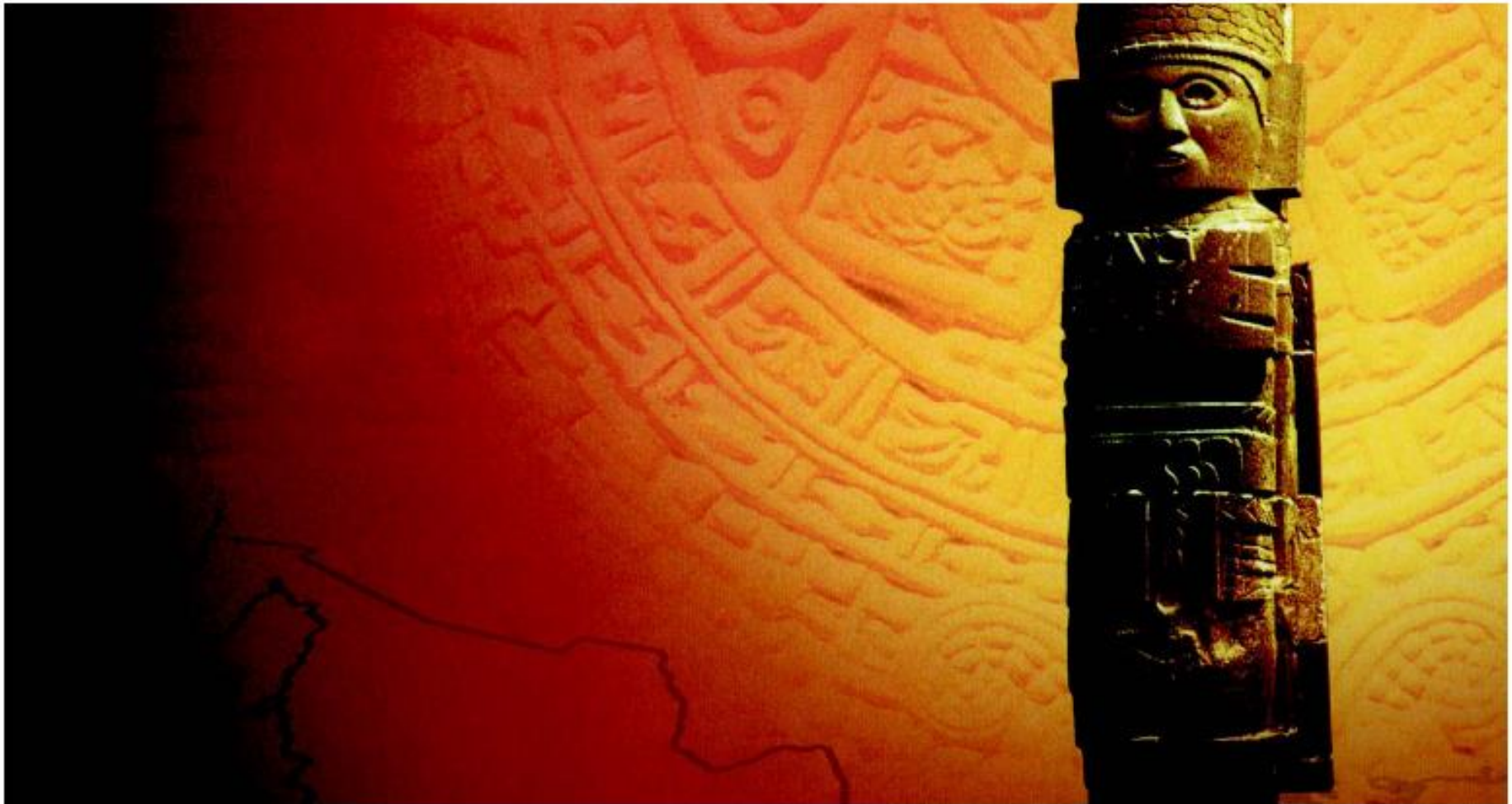
International Oil Companies

- Have the exploration skills
- Have project management and implementation skills
- Are informed buyers
- Have come up the learning curve
- Have decision making flexibility

Conclusion

Conclusions

- **Deepwater has become the main source of new field oil and gas reserves**
 - it's the reason that exploration overall has created value over recent years
 - difficult for a Major to have achieved significant organic growth without deepwater
- **Deepwater in Mexico offers excellent Yet-to-Find potential**
 - difficult for Pemex to deliver future production growth without deepwater
- **Pemex have no choice but to learn “Deepwater”**
 - but very difficult to do efficiently under current constraints
 - need to fully understand the costs and risks associated with the “learning curve”
- **Deepwater development is an operational challenge**



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