

The Finding Petroleum Forum

The Saga of EOR

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Some Background Information

Upstream Costs 2007-2009

\$/boe

	F&D	+	Production	=	Upstream
• North Sea	42.32		11.05		53.37
• USA					
onshore	18.65		14.08		32.73
offshore	41.51		10.09		51.60
• Africa	35.01		10.31		45.32
• FSU	13.92		7.04		20.96
• Middle East	6.99		7.96		16.88
Worldwide	18.31		11.50		29.81

Notes: Production costs = direct costs + taxes. Taxes for USA 36%; Europe 17%; FSU 7%; Africa 26%; Middle East 36%;
World 28%

Source: EIA 2011.

Recent M&A Metrics

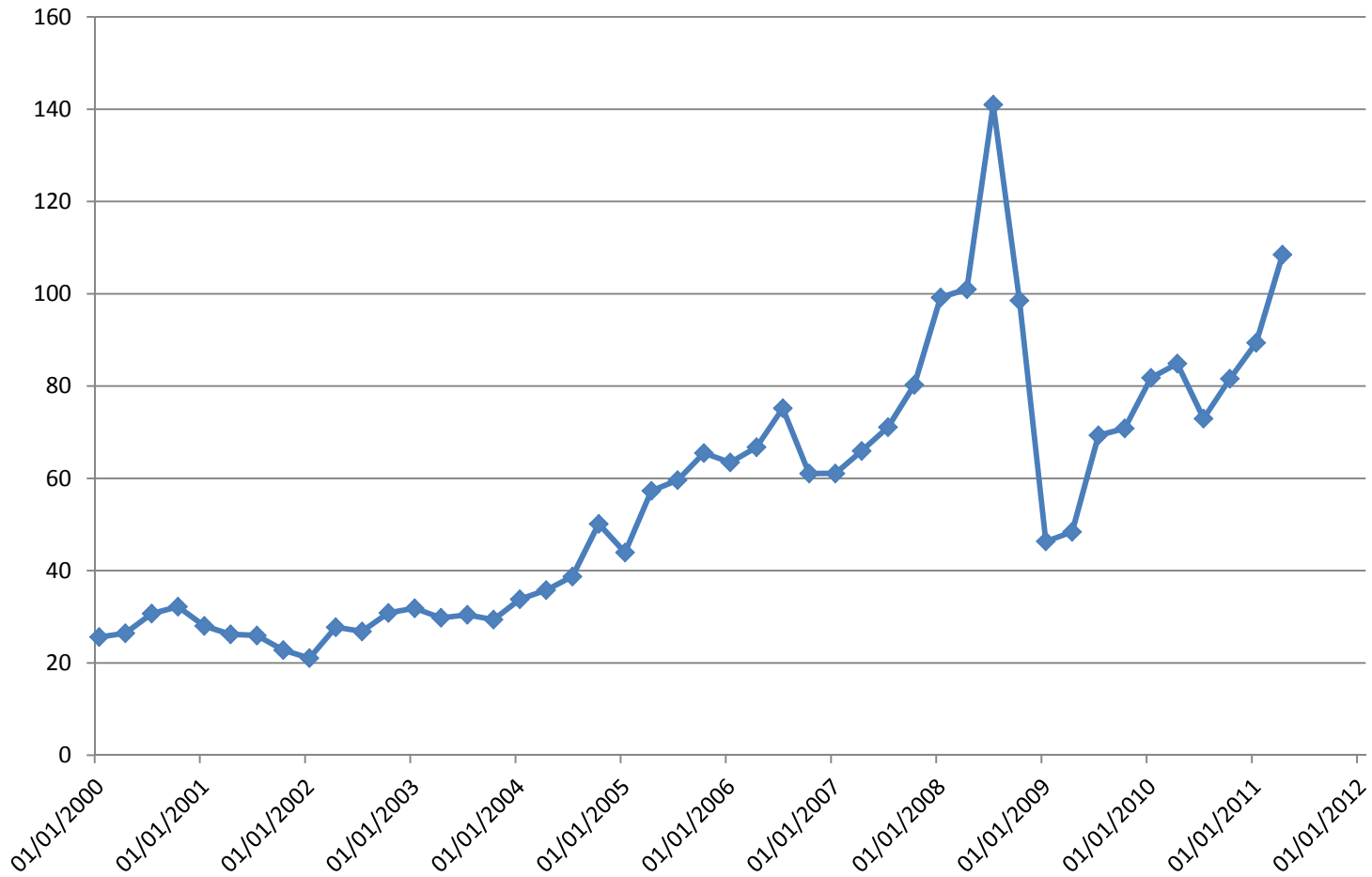
\$/Bbl 2P Reserves

- **Barnett** **\$16/bbl**
- **Permian** **\$20**
- **GoM shallow** **\$30**
- **UK (Seller/Premium Oil)** **\$11**
- **Norway (Seller/Hess)** **\$ 5**

Source: O&GFinancial J., Dec. 2011

Monthly Oil Prices (WTI) since 2000

\$/barrel



World Oil Supply/Demand - last 5 years

million b/d

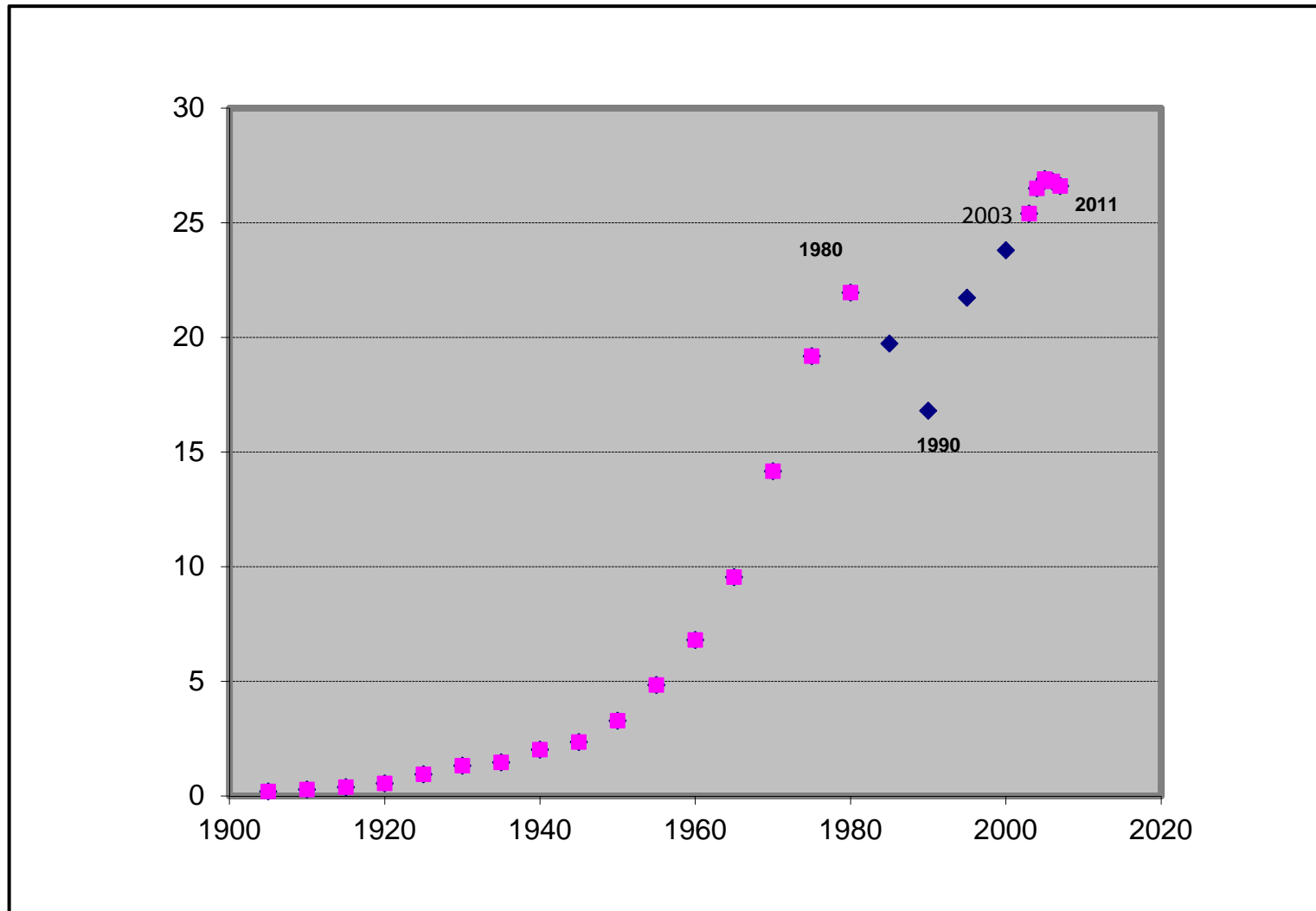
	<i>2005</i>	<i>2008</i>	<i>2010</i>	<i>Growth, kb/d/year</i>
• Crude Oil	73.7	73.7	74.0	flat
• NGLs	7.6	8.0	8.4	160
• Refining Gains	2.1	2.1	2.2	flat
• Biofuels	0.7	1.5	1.8	230
• Other Liquids	0.5	0.2	0.2	
WORLD Oil Supply	84.6	85.5	86.7	420
<i>OPEC</i>	<i>34.9</i>	<i>35.5</i>	<i>34.5</i>	<i>flat</i>
<i>Avg. Oil Prices (Brent), \$/b</i>	<i>54.57</i>	<i>96.94</i>	<i>79.61</i>	

Notes: Crude oil (including condensates) accounts for 85% of total supply; NGLs, 10%; Ref. gains 2.5%, Biofuels 2%

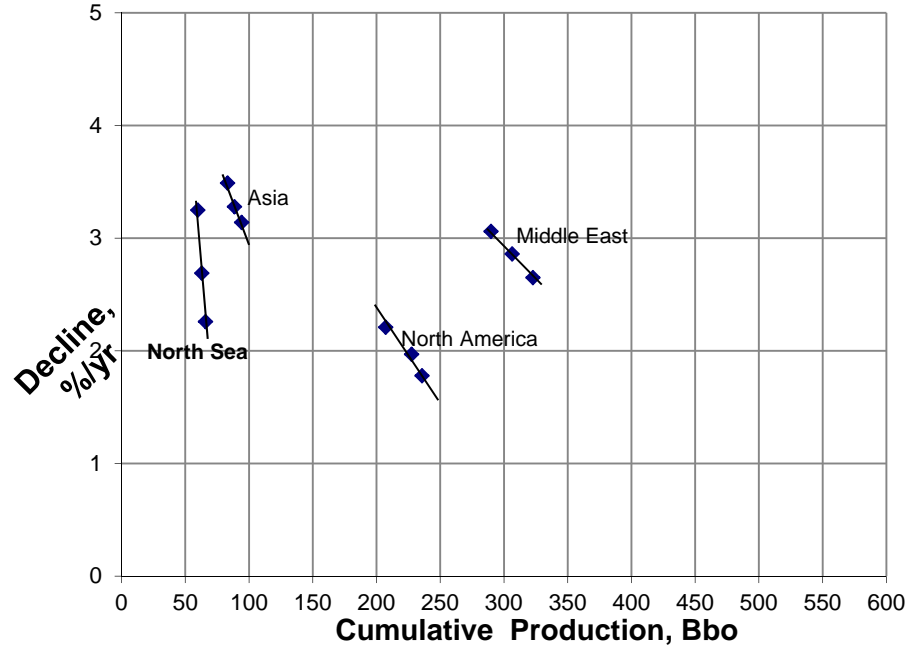
Sources: EIA; O&GJ

World Crude Oil Supply since 1900

billion bbls/year



Regional Decline Rate Trends



Why We Need EOR

Oil Discoveries & Production – Past Decade

Bbo

2000-2010

	Discoveries	Production	P/D Ratio
• North Sea	4	21	5.2
• World	135	286	2.1

Source: WPC, Doha, Dec. 2011

North Sea Oil Production – Past & Future

million b/d

	<i>2005</i>	<i>2010</i>	<i>2030</i>
• Norway	2.70	1.86	0.140
• UK	1.61	1.21	0.075
• Denmark	0.38	0.24	-
• Germany/NL	0.05	0.03	-
• TOTAL	4.74	3.34	0.215

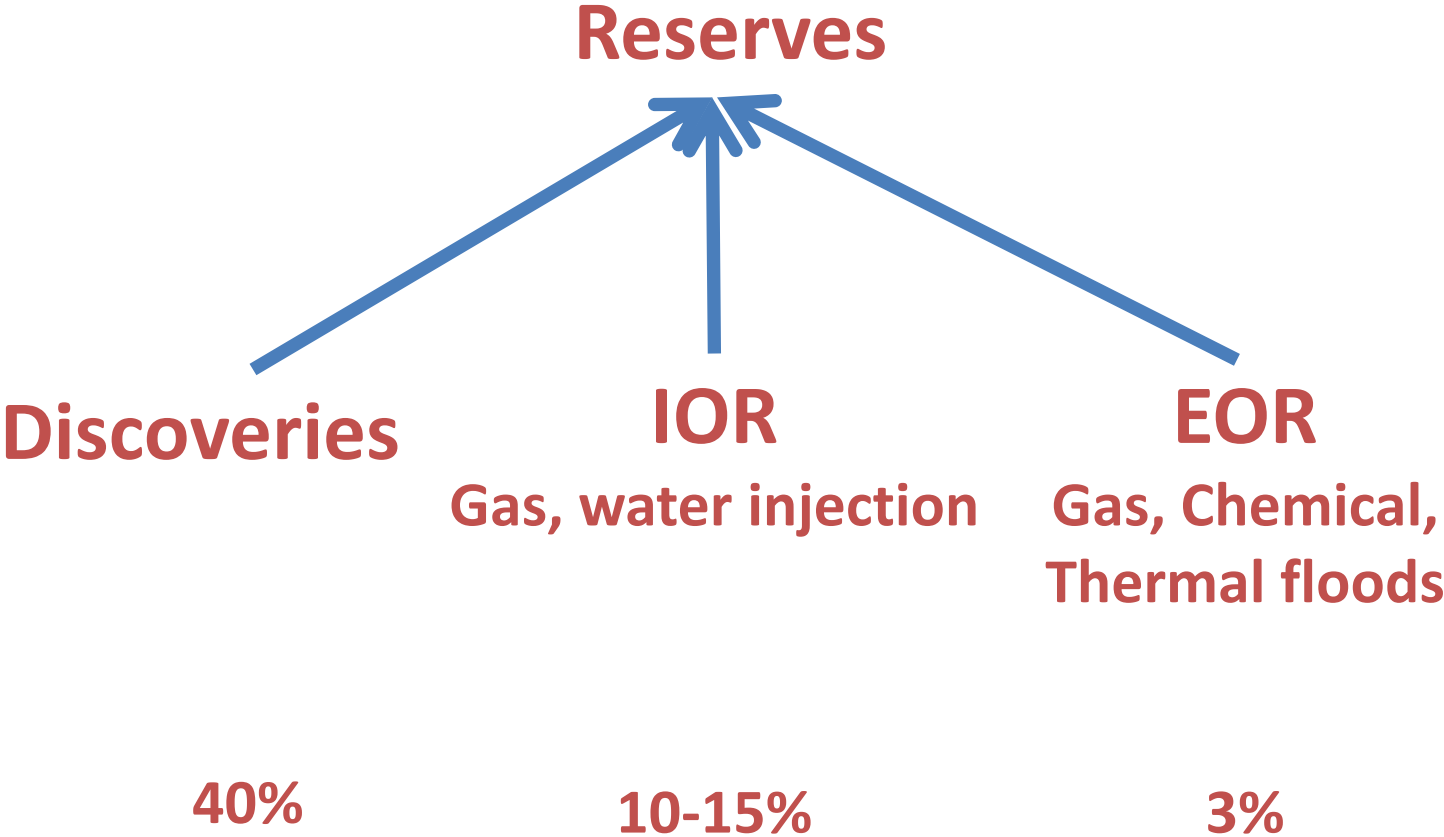
Notes: a) Number of o&g fields in the North Sea: UK (320), Norway (70), others (20)

b) Gas production: 21 bcf/d (2010); 4 bcf/d (2030)

Source: EIA

Global Sources of Production

(% of world production that comes from new discoveries, IOR & EOR)

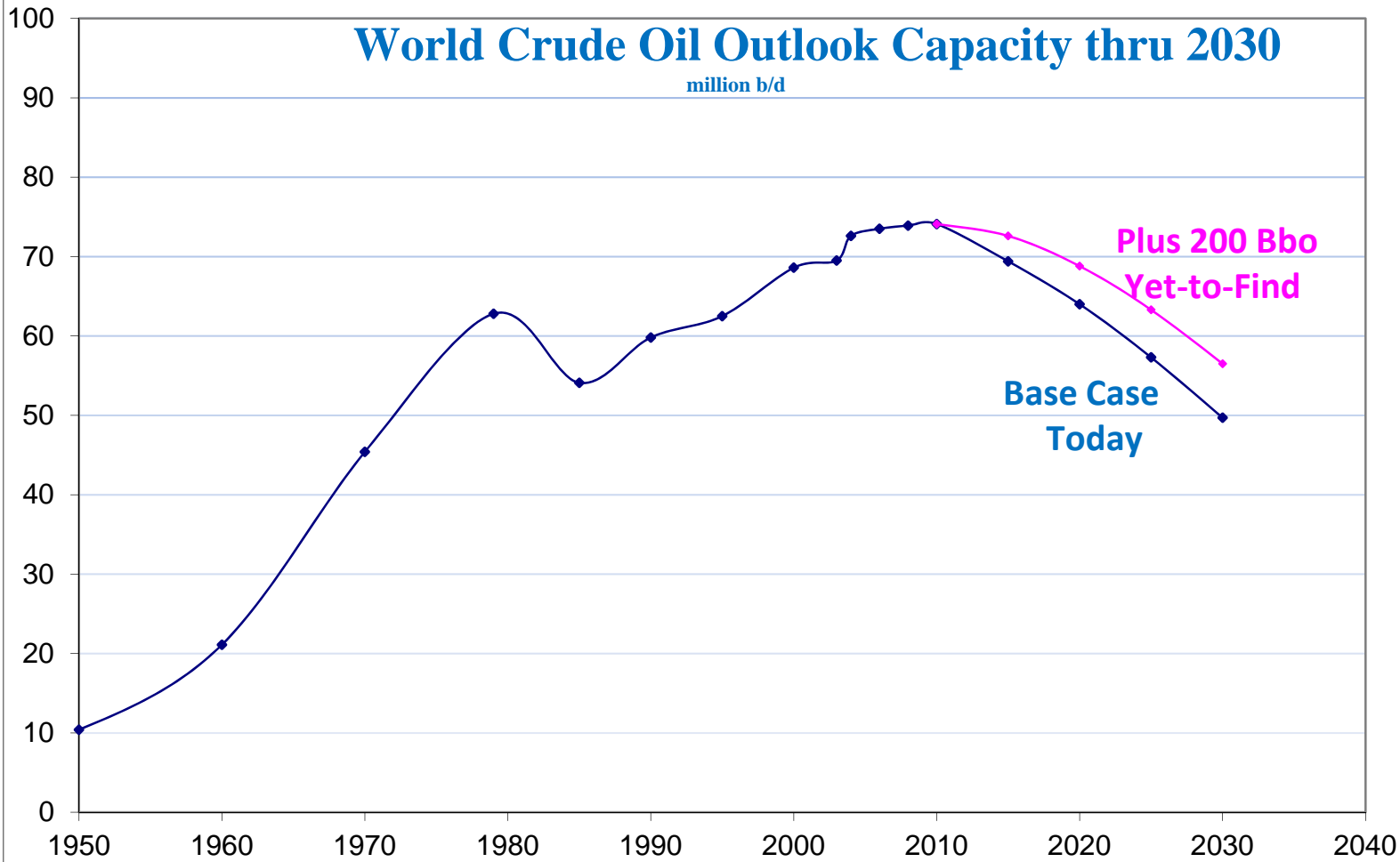


How Much Oil do We Have to Work With (For EOR Purposes)

Global Oil Resources (OOIP) Discovered so Far

trillion barrels

- **DISCOVERED thru 2010**
 - **Light oils (>25 API) 9.4 Tbo**
 - **Medium/Heavy (10-25 API) 1.5**
 - **Xtra Hvy (<10 API) 3.0 _____ 14 Tbo**
 - **PRODUCED thru 2010 1.1..... 10%**
 - **STILL IN THE GROUND 90%!!!!!!**
-
- **Current World Recovery Factor 22% (v. low!)**
 - **Tech. attainable 60+%**
 - **North Sea 47%**
 - **US 37%**
 - **Middle East 25%**



Finale

- **EOR** is the largest source of conventional oil on the planet>>>>8.5 trillion barrels of >25 API oils still in the ground!!!!
- **1%/year** increase in Recov. Fact.>>>>85 Bbo/year. Equivalent to 8 years of Exploration efforts!!!!
- **EOR** can contribute easily 500 kb/d/year>>>equivalent to demand growth. 500 kb/d >>>>Field the size of 2.4 Bbo
- **EOR** is quite a challenge:
 - Requires high upfront investments
 - Pay-out period is long
 - Very R&D intensive
- **Tax incentives** a must – the most interested Stakeholders are the Producing Countries

Thank You

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