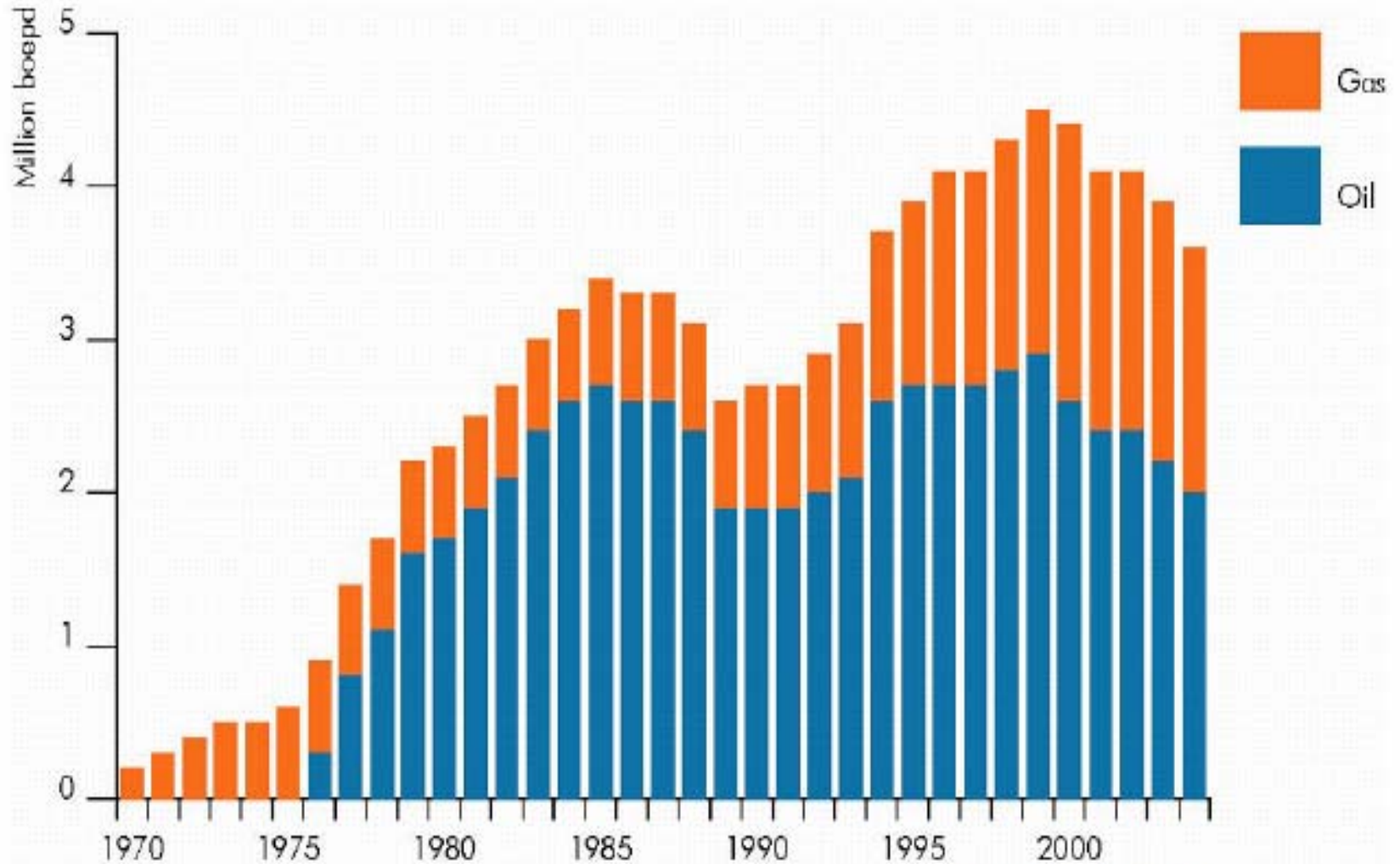


Prospects for Activity Levels in the UKCS: the 2005 Perspective

Professor Alex Kemp

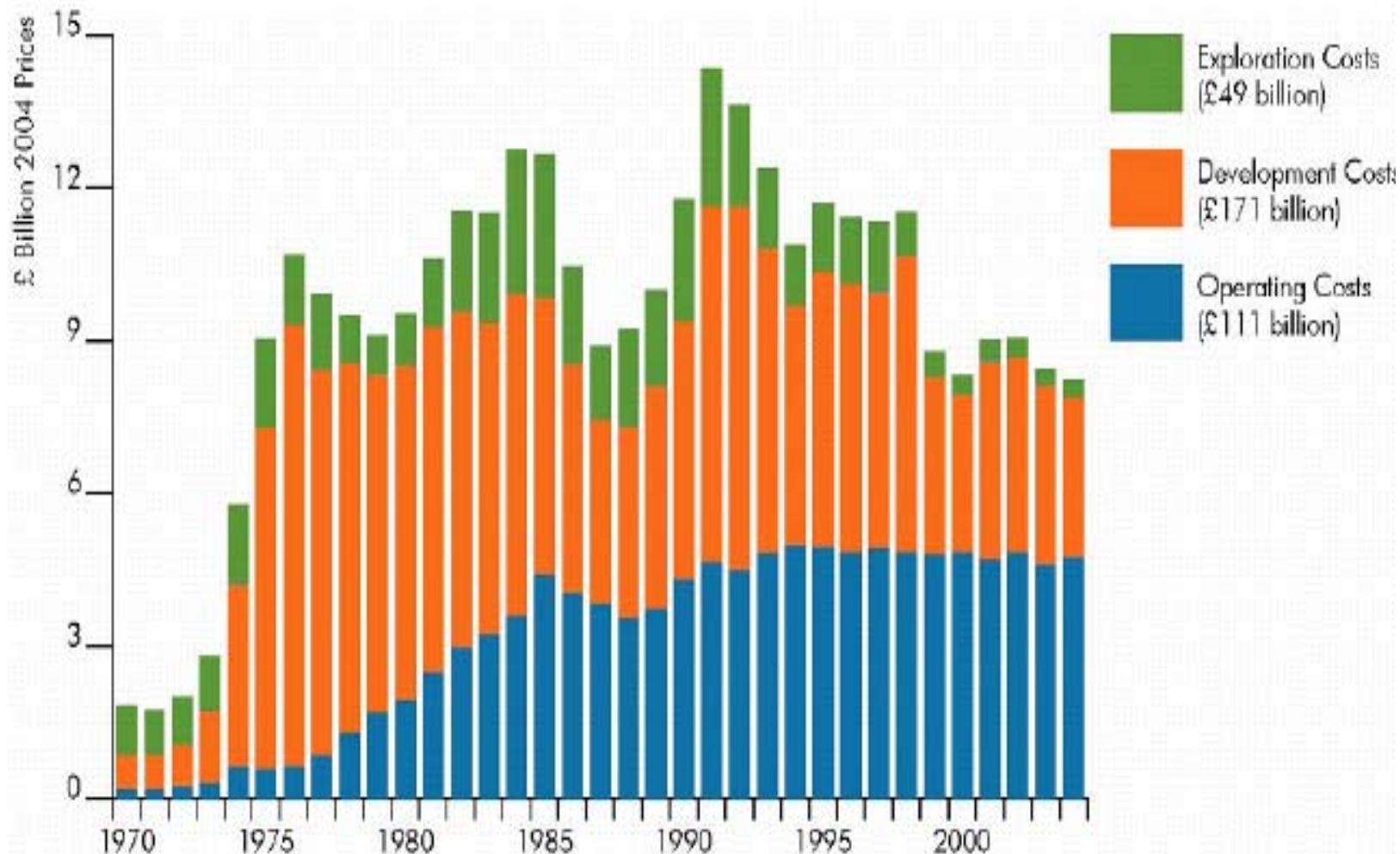
UK Oil and Gas Production 1970-2004



Source: DTI / UKOOA

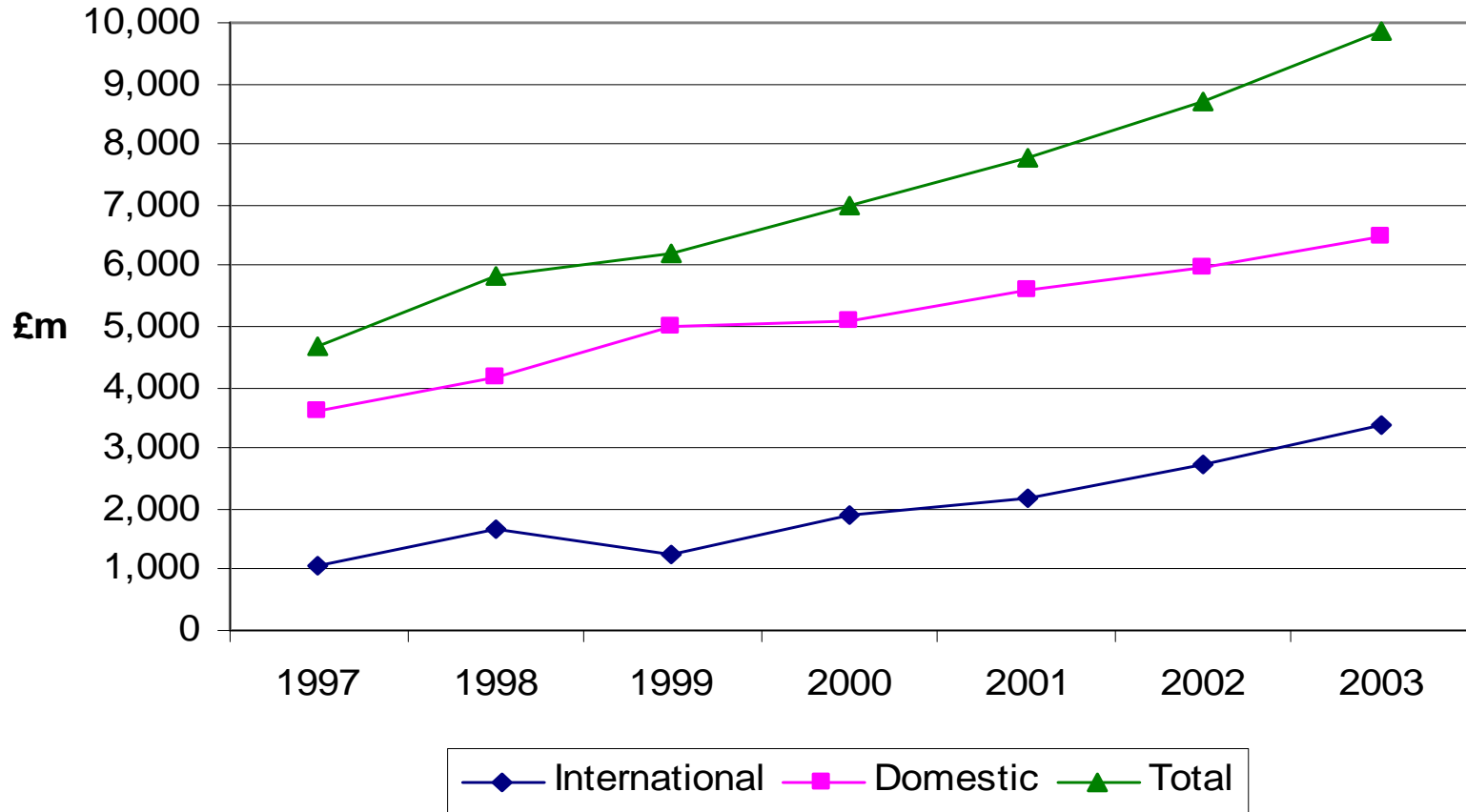


UK North Sea Expenditure (2004 Prices) 1970 - 2004



Source: DTI / UKOOA

Scottish Oil-Related Industries International and Domestic Market Sales 1997-2003

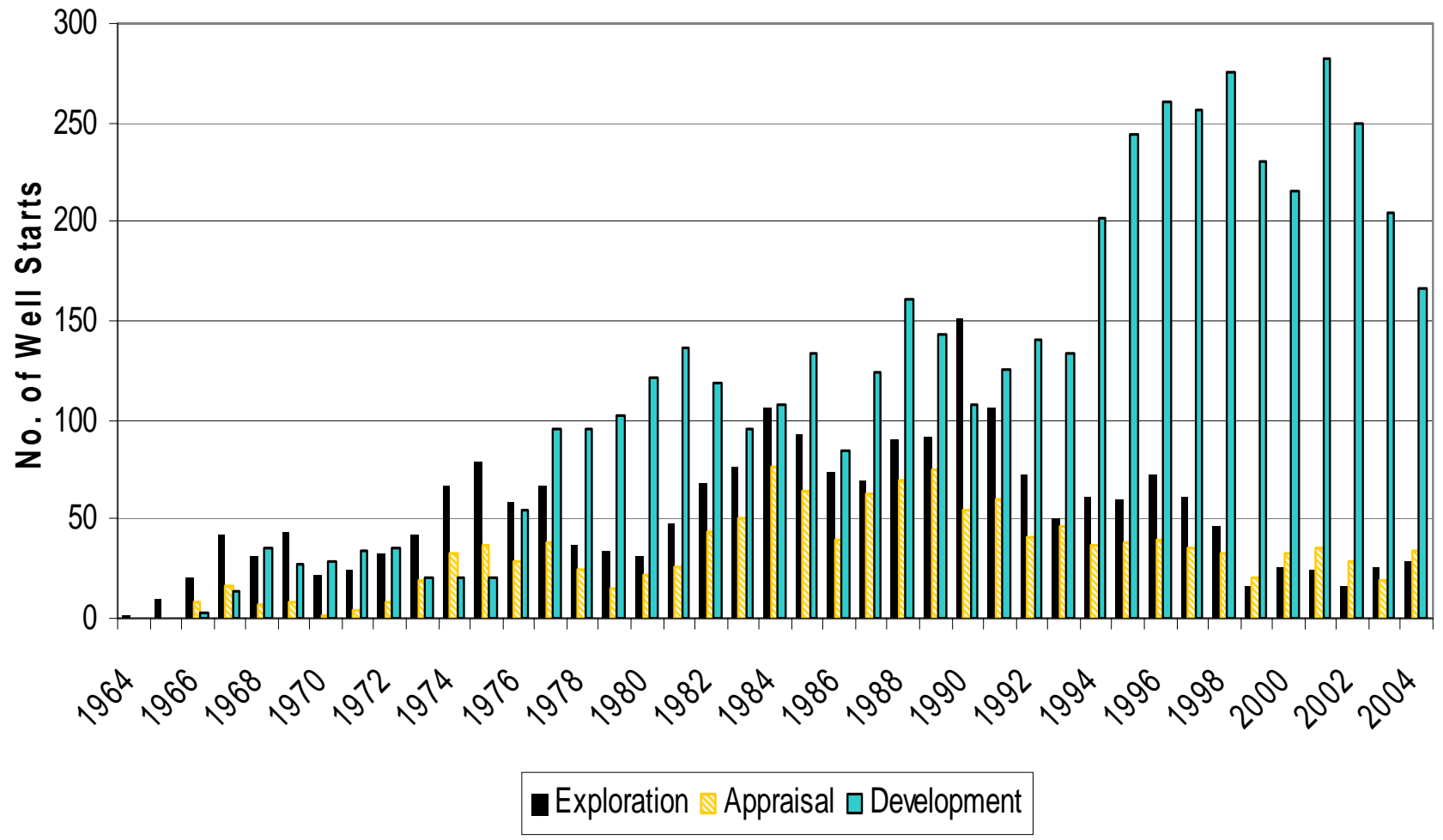


Source: SCDI



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UKCS Drilling Activity 1964-2004

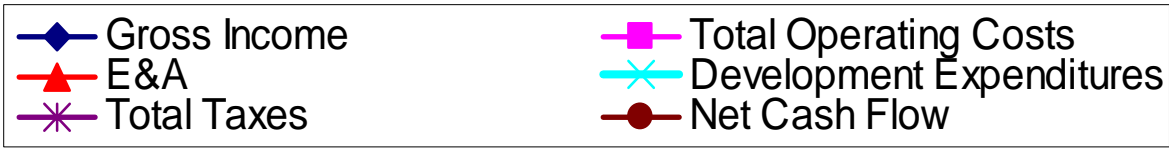
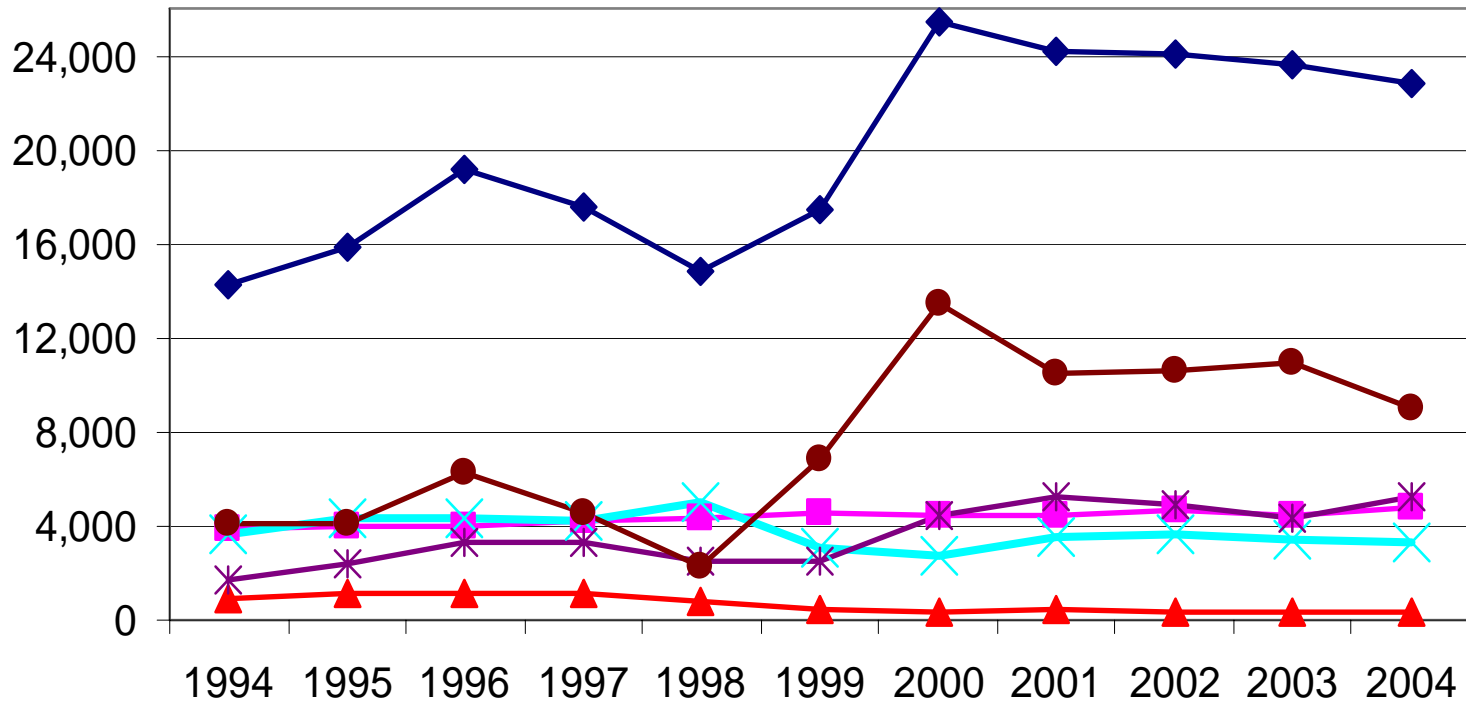


Recent UKCS Exploration Experience

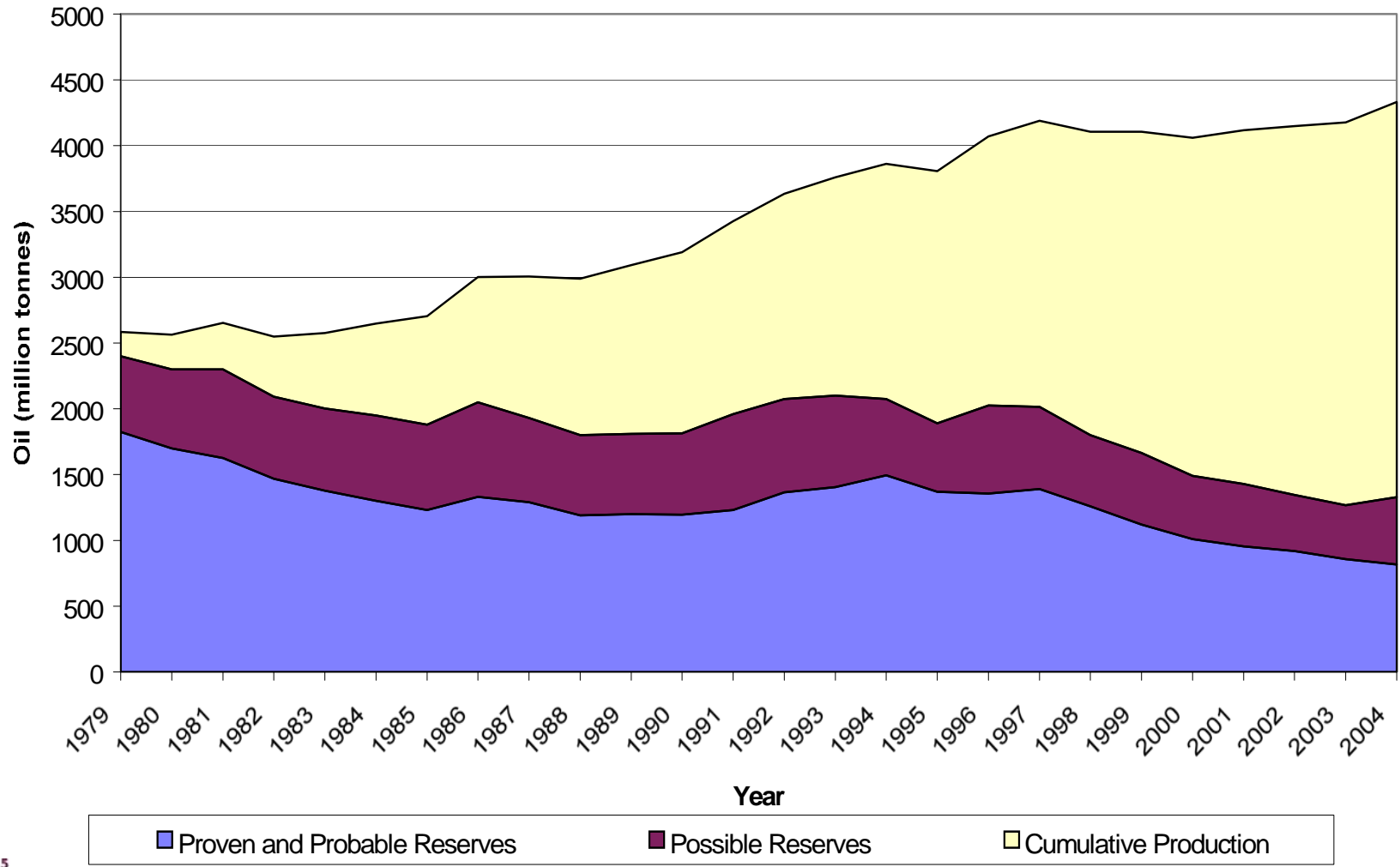
Year	Ex. Wells	Appr. Wells	Total E&A	E&A Costs £m	E & A Costs per Well £m	Significant Discoveries	Success Rate (%)
1996	72	40	112	1,097	£9.79	12	17
1997	61	35	96	1,194	£12.44	14	23
1998	47	33	80	762	£9.52	9	19
1999	16	20	36	457	£12.69	7	44
2000	26	33	59	348	£5.9	6	23
2001	24	36	60	420	£7.0	8	33.
2002	16	28	44	389	£8.84	5	31.25
2003	26	19	45	334	£7.42	5	19.2
2004	29	34	63	c.400	c.£6.35	5	17.2
Total	317	278	595	5,401		71	
Average	35	31	66	600	£9.08	8	22.4

Receipts and Payments in UKCS

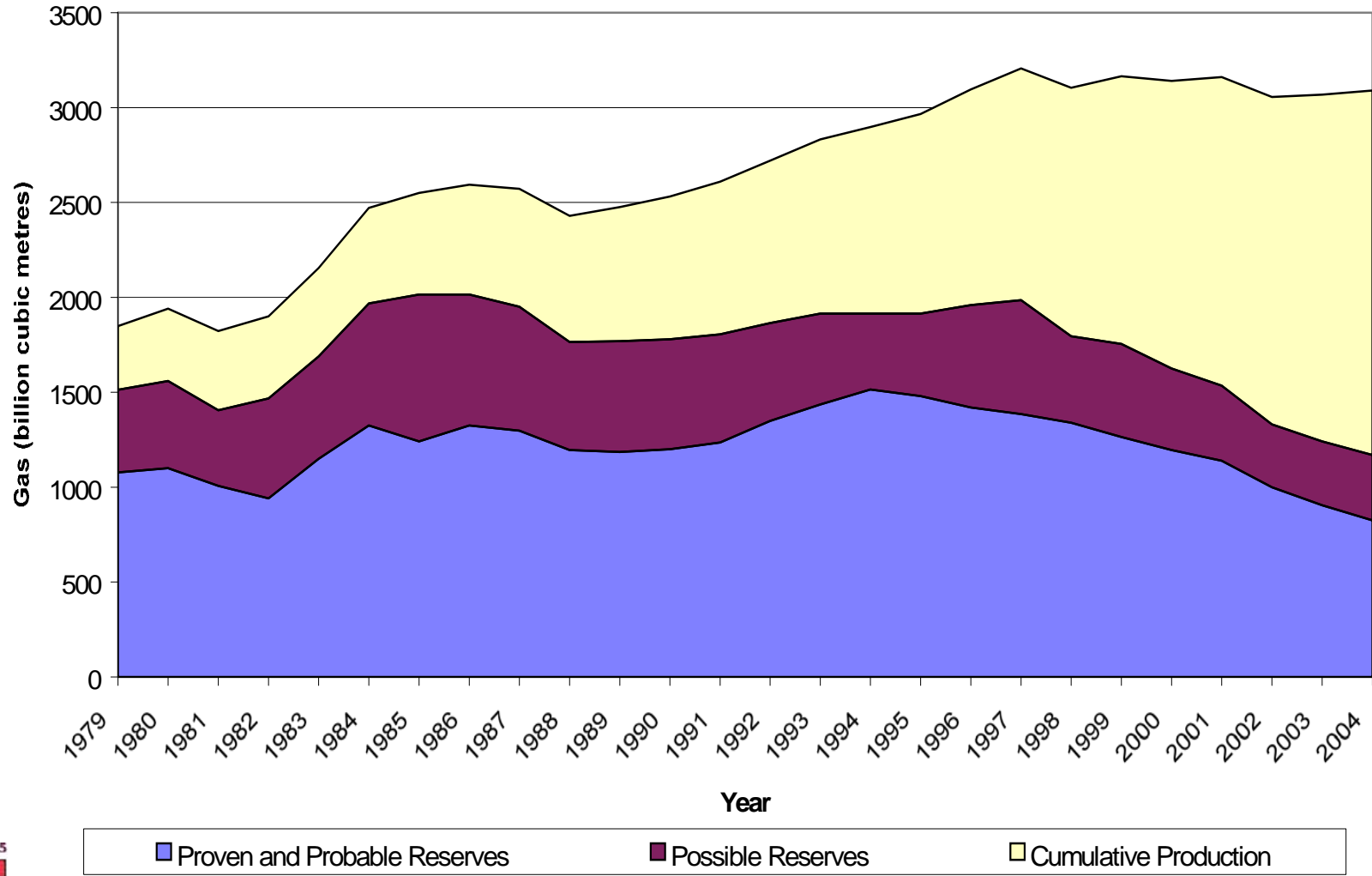
£m



Oil Reserves v Time



Gas Reserves v Time



Estimates of Remaining Potential (Bn Boe (rounded))

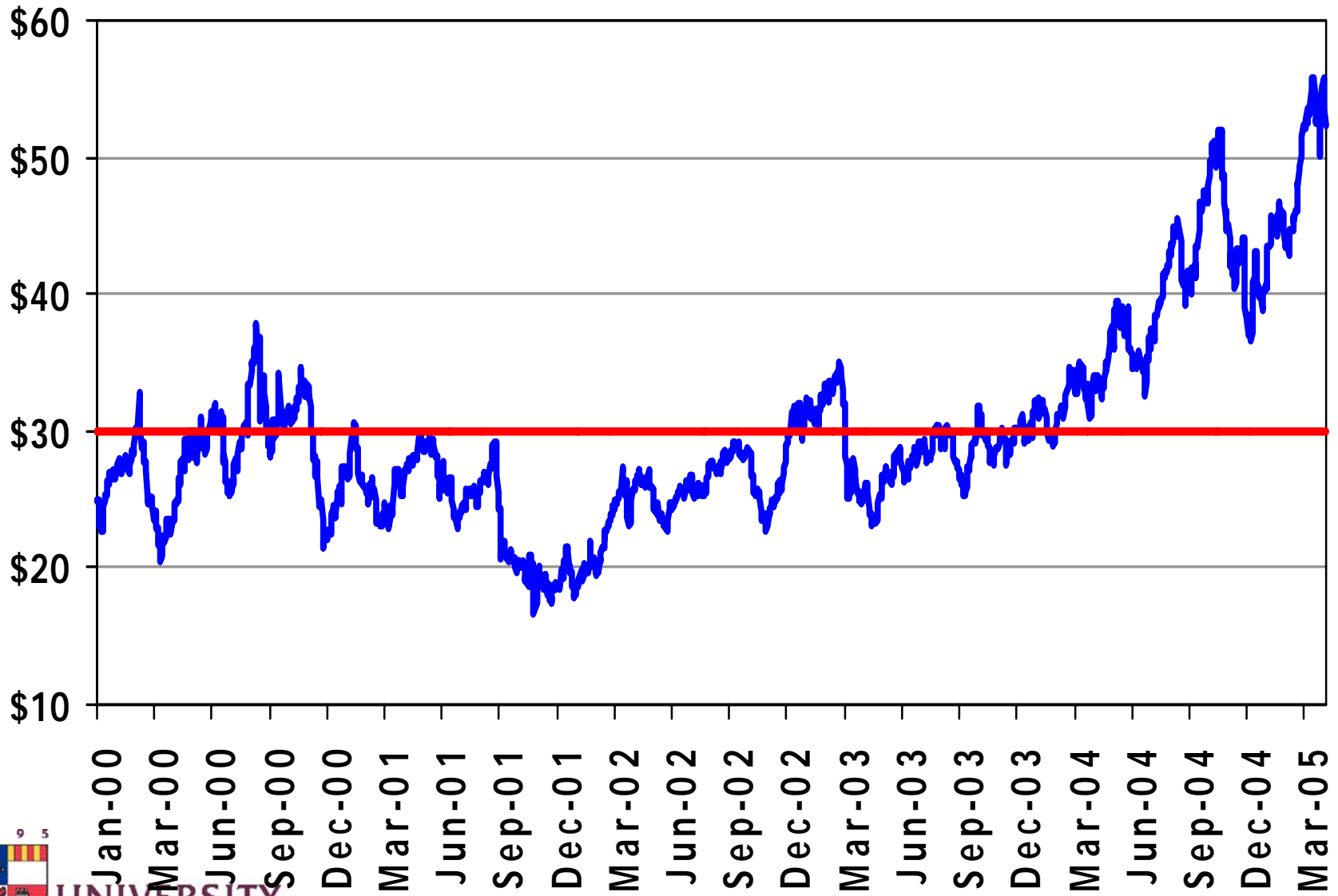
	Low	Central	High
Discovered + PAR	8.3	13.6	22.1
Yet-to-Find	4.7	9.5	21.2
Total	12.9	23.1	43.3

Total depletion to date: 34.2 bn boe

Source: DTI, July 2005



Oil Price



Methodology and Assumptions

1. Large financial simulation model including Monte Carlo risk analysis employed utilising 3 databases as follows:
 - a. Historic field production, discoveries, field sizes, E and A effort.
 - b. UKOOA field database (late 2004 vintage), sanctioned fields (274), incremental projects (142), probable (40) and possible fields (20).
 - c. Database of technical reserves updated (216 fields). Includes some fields formerly in possible category.

2. New discoveries were modelled according to following procedures:
 - a) Exploration effort based on combination of (i) average since 1997 and (ii) prospective oil/gas price behaviour (sustained).

Three oil/gas price cases as follows:

	Oil Price (real) \$/bbl	Gas Price (real) Pence/therm
High	40	36
Medium	30	28
Low	20	18

The numbers of exploration wells (linear trend) in relation to the 3 price cases are as follows:

	2005	2028
High	50	38
Medium	38	27
Low	25	15



b) Success rates based on combination of (i) experience in period since 1997 and (ii) size of effort. In relation to (ii) it is assumed that higher effort is associated with more discoveries but lower success rate than with medium effort. Similarly with medium and low effort. For whole of UKCS success rate under Medium Effort/Medium Price = 23%.

Technological progress maintains these success rates in the period to 2030.

Data on discoveries for the period from 1997 were taken from the database.

Data on average sizes of discoveries were also taken from the database.

3. The aggregate historic data on (i) exploration effort and (ii) discoveries were disaggregated according to main regions, namely SNS, CNS, MF, NNS, WOS and IS. Regional trends were established for relative exploration effort, discoveries and success rates. This includes splitting according to type (oil, gas and condensate).

4. Using the above information the Monte Carlo technique was employed to project discoveries in all 6 regions in the period to 2030.

5. In the Monte Carlo modelling it was assumed that the size distribution of discoveries would be lognormal following historic evidence. The SD was set at 50% of the mean value. The mean size of field decline through the period was again based on historic evidence. Monte Carlo modelling was also used to calculate the field development costs. For each region the average development cost (per boe) of fields sanctioned in 1990's plus the probable and possible fields was calculated. The SD was assumed to be 20% of the mean.

6. The annual numbers of field developments going ahead were assumed to be constrained by the capacity (physical and financial) of the industry. Over the longer term the ceilings on the total numbers of potential field developments (excluding incremental investments) were assumed to be as follows:

High Price	32
Medium Price	27
Low Price	20

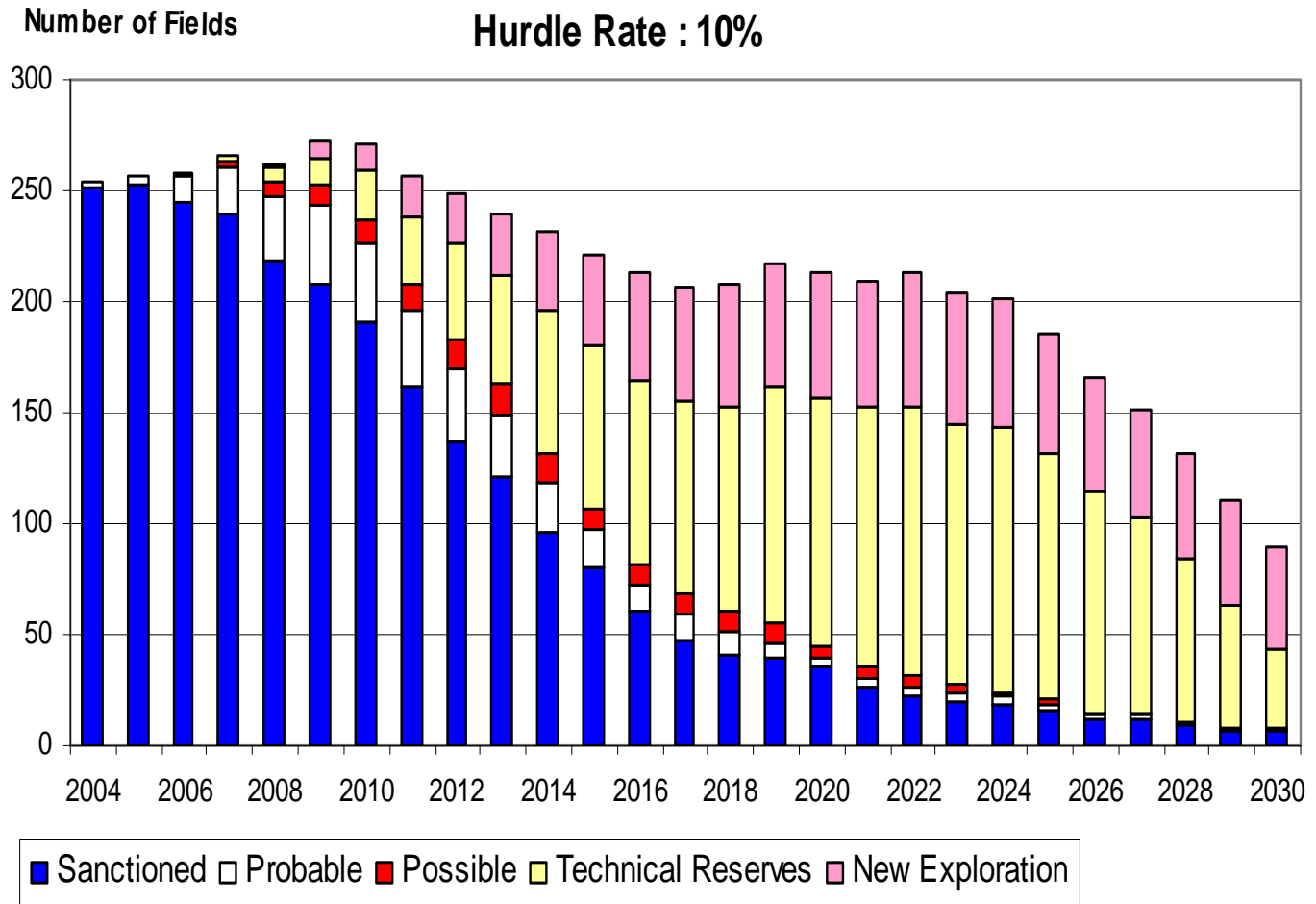
The constraint took the form of curtailing the number of fields in the technical reserves category from going ahead. The Monte Carlo technique was used to project through time the particular fields in this category which could be developed. Mean development costs for technical reserves were set at \$1/boe higher than the mean for new discoveries.

7. The numbers of field developments were constrained by an economic hurdle. Costs of capital of 10% and 15% in real, post-tax terms were employed.

Incremental Projects

1. Those currently being examined should mostly be executed in next 3 years if they pass economic hurdle.
2. It is very likely that further incremental projects will be examined in medium/longer term.
3. To obtain understanding of eventual potential further hypothetical incremental projects were modelled. They are based on trends in volumes and costs for incremental projects over the past few years.
4. The execution of the additional incremental projects depends on the prolongation of the lives of the infrastructure and possibly other incentives.
5. No guarantee that extra projects will be undertaken.

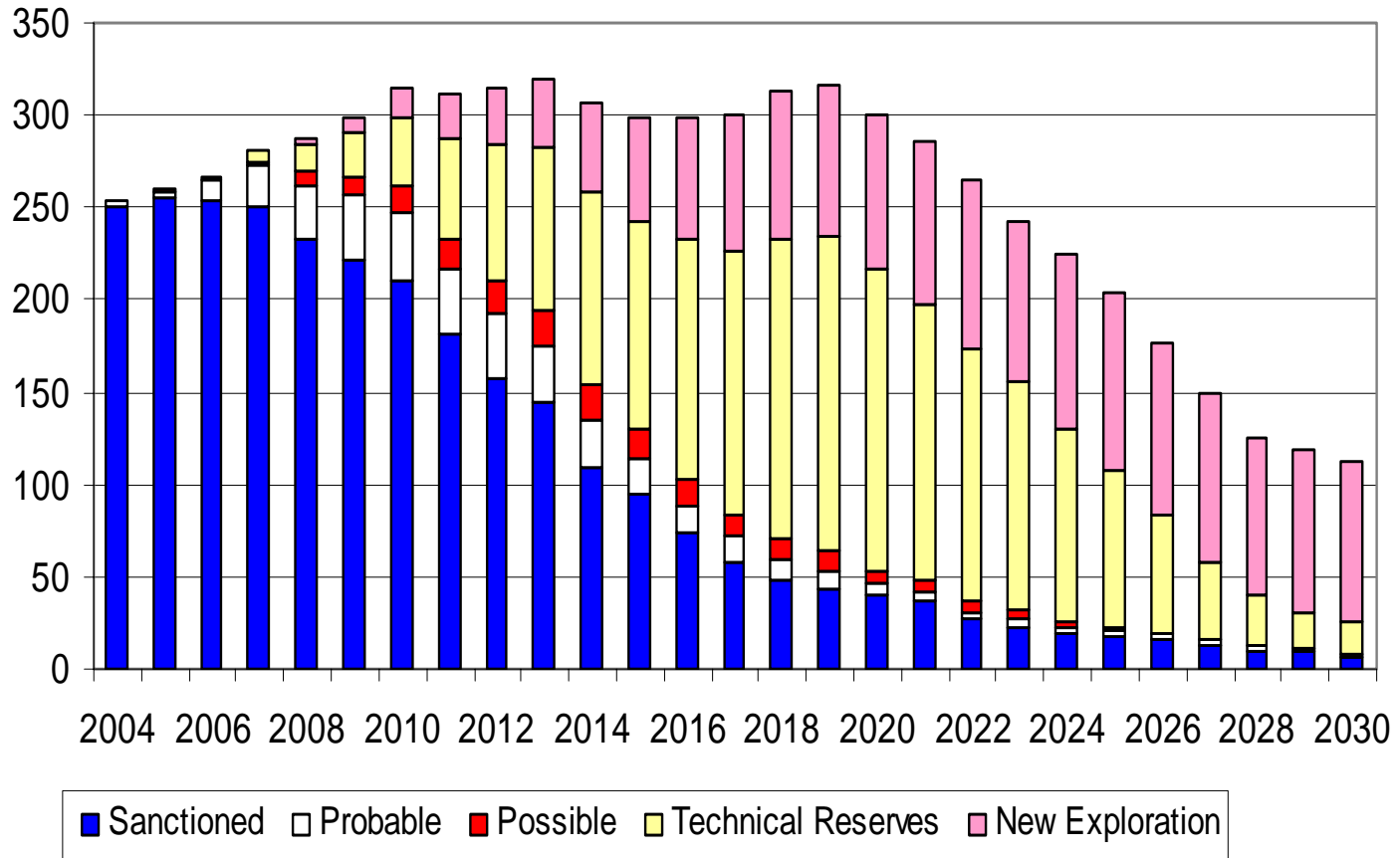
Potential Number of Fields in Production \$20/bbl and 18p/therm Hurdle Rate : 10%



Potential Number of Fields in Production \$30/bbl and 28p/therm

Number of Fields

Hurdle Rate : 10%

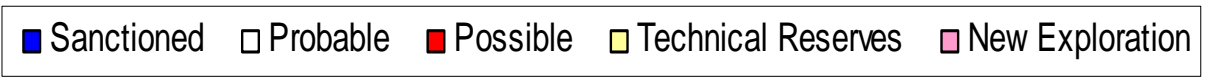
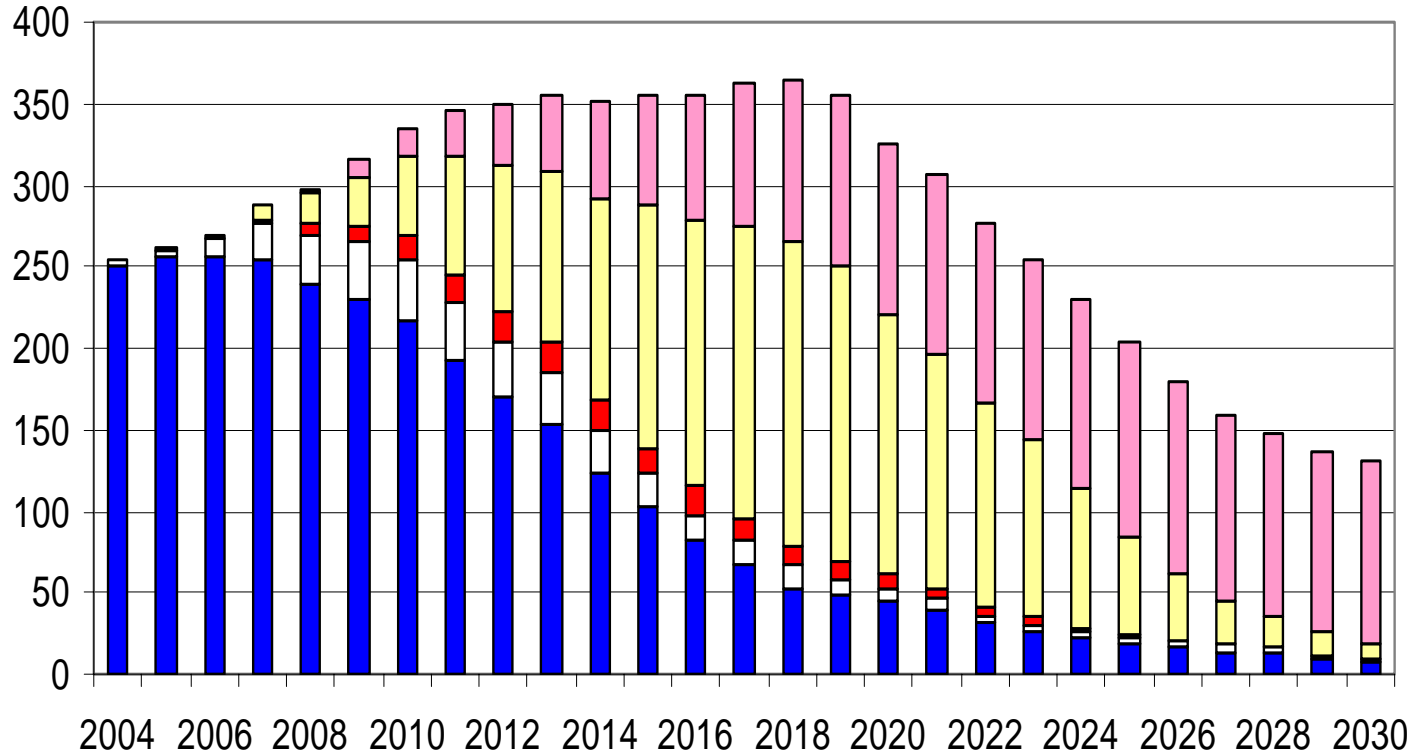


Potential Number of Fields in Production

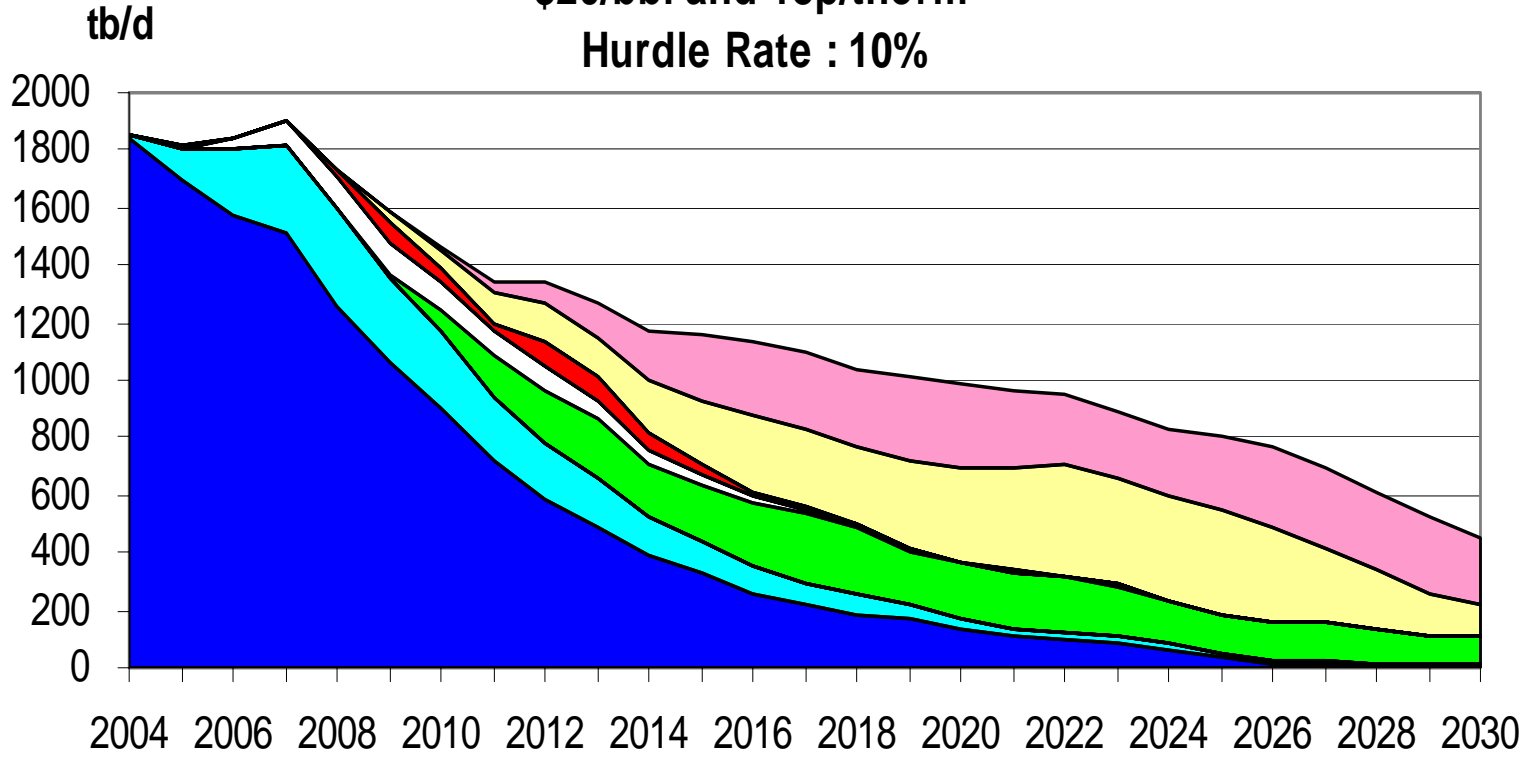
\$40/bbl and 36p/therm

Hurdle Rate : 10%

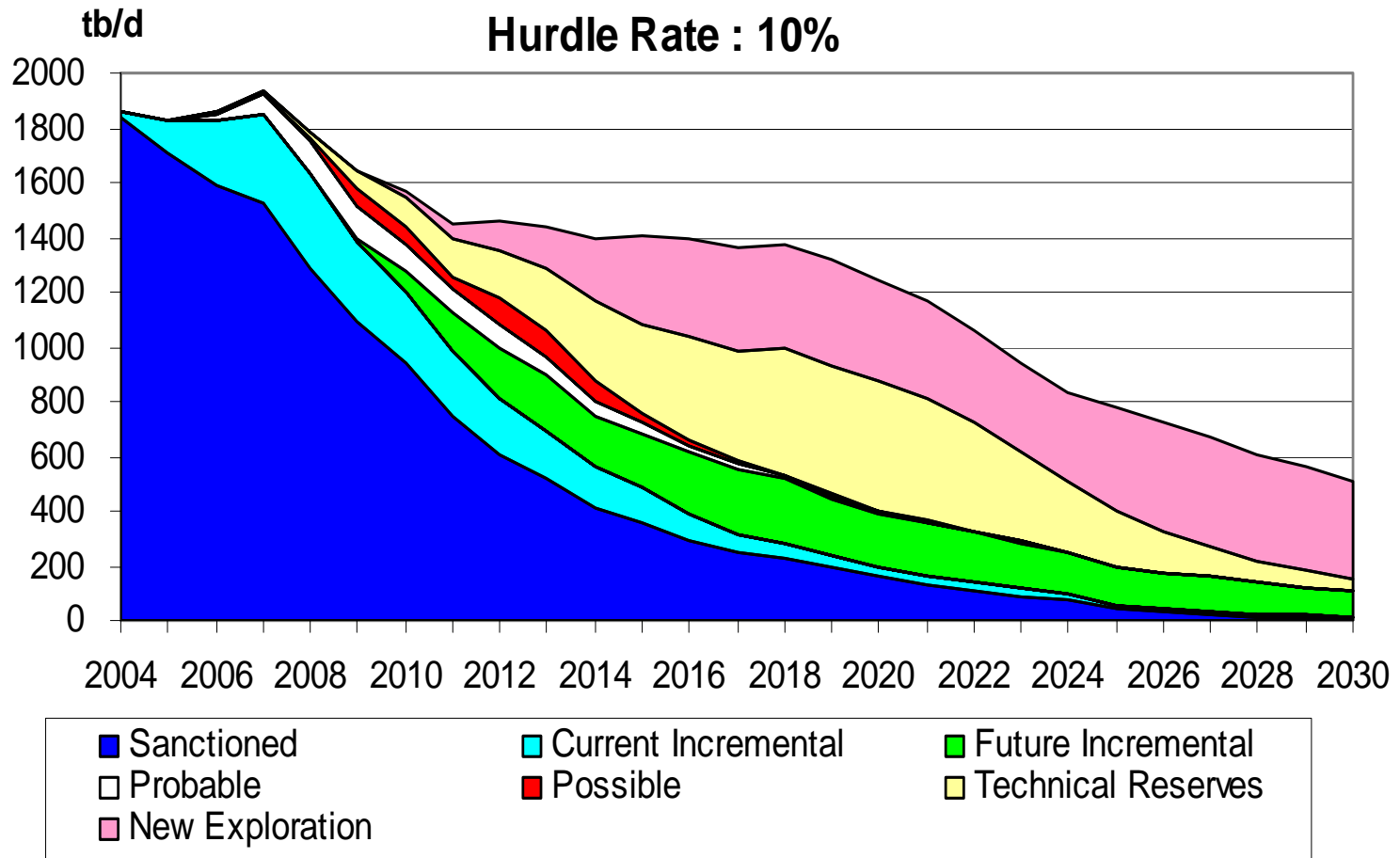
Number of Fields



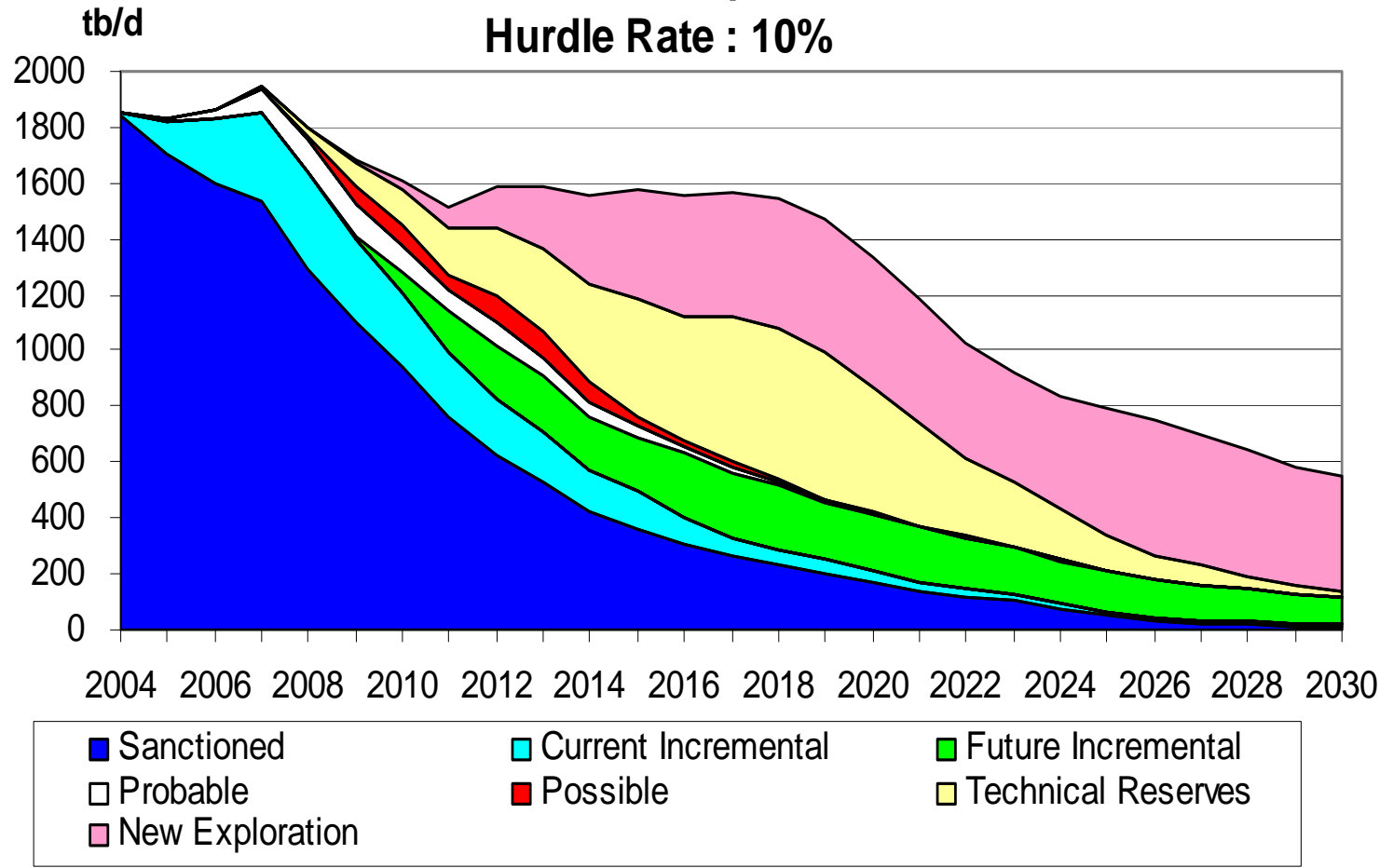
Potential Oil Production
\$20/bbl and 18p/therm
Hurdle Rate : 10%



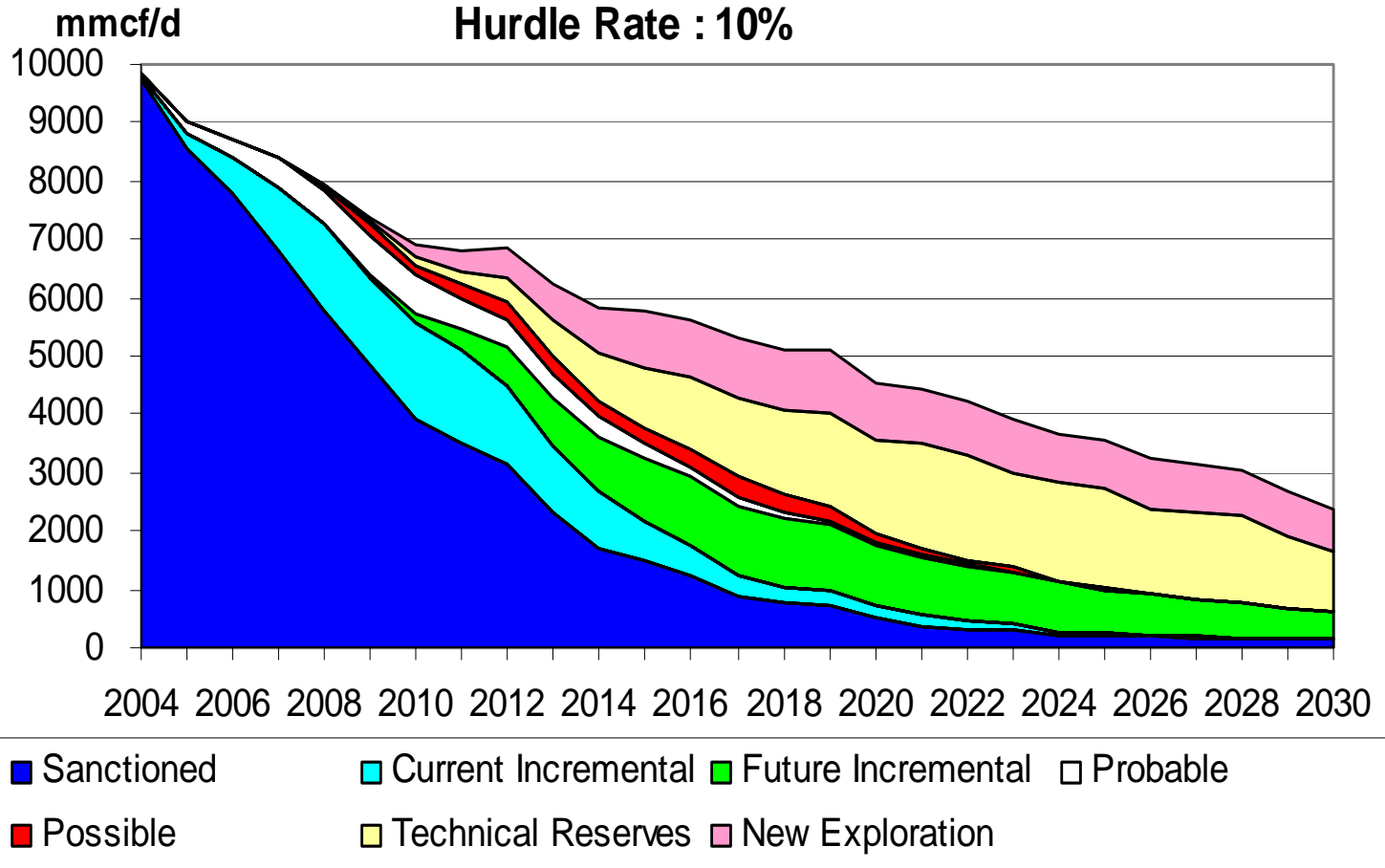
Potential Oil Production \$30/bbl and 28p/therm Hurdle Rate : 10%



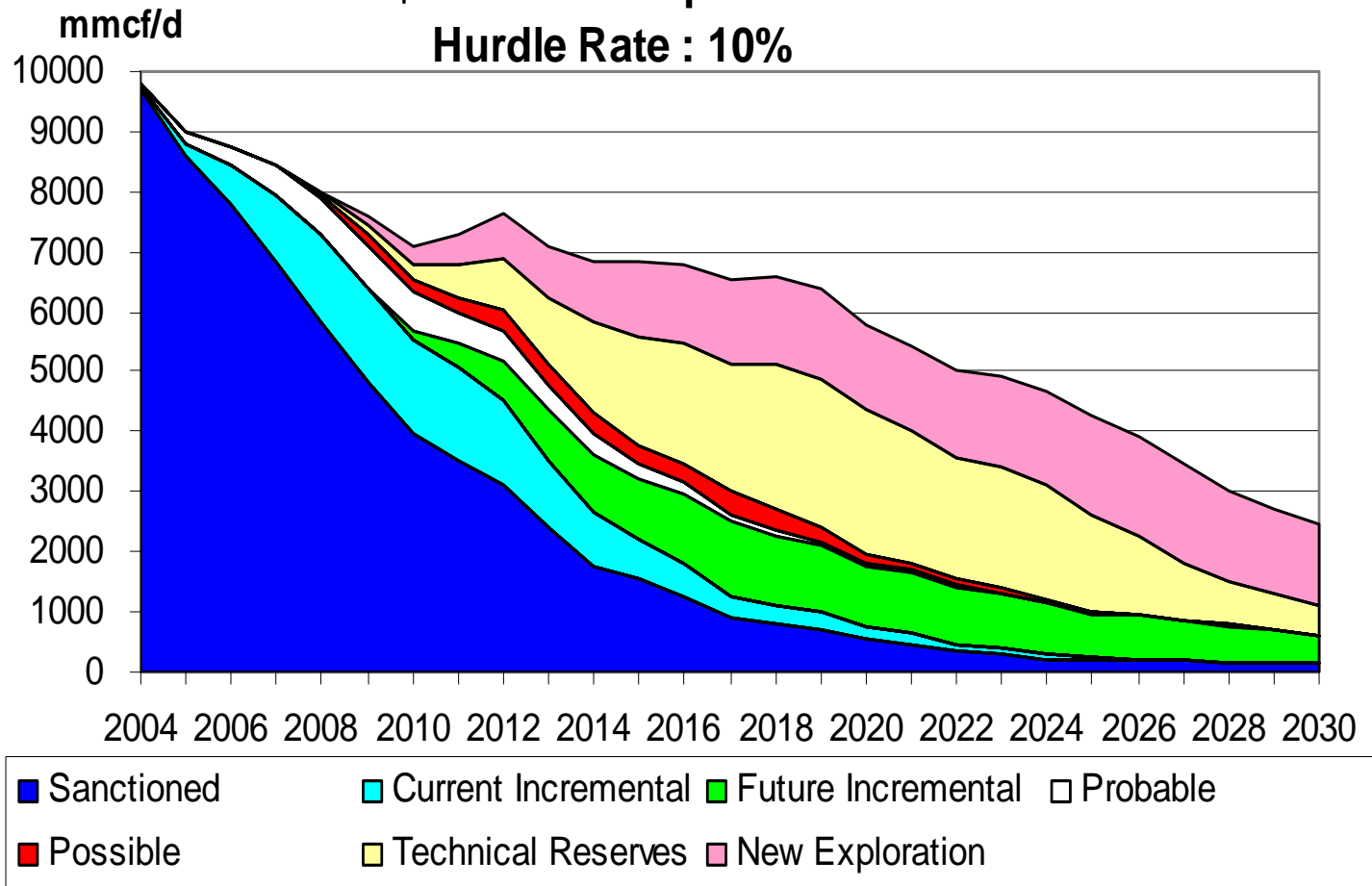
Potential Oil Production \$40/bbl and 36p/therm Hurdle Rate : 10%



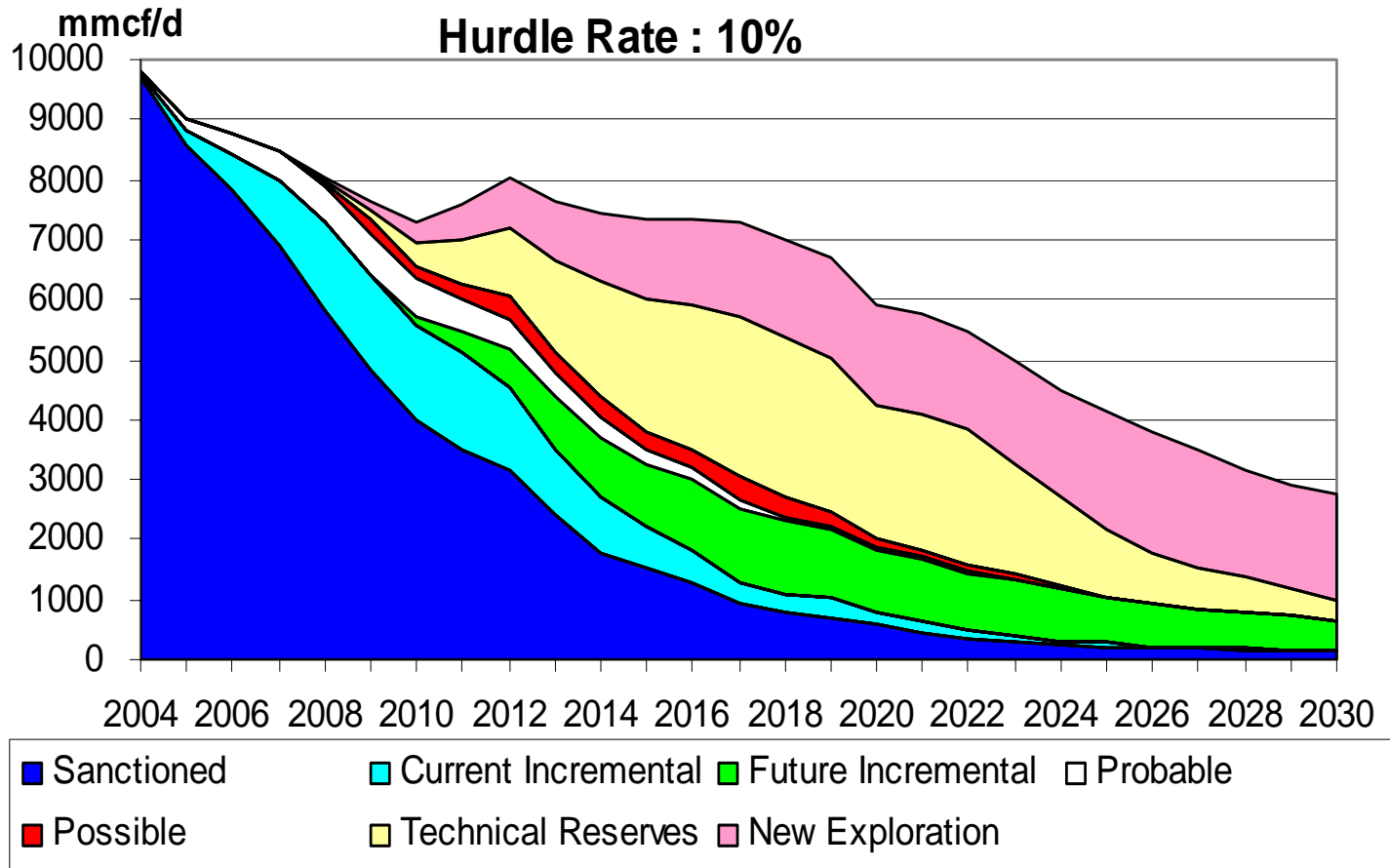
Potential Gas Production \$20/bbl and 18p/therm Hurdle Rate : 10%



Potential Gas Production \$30/bbl and 28p/therm Hurdle Rate : 10%

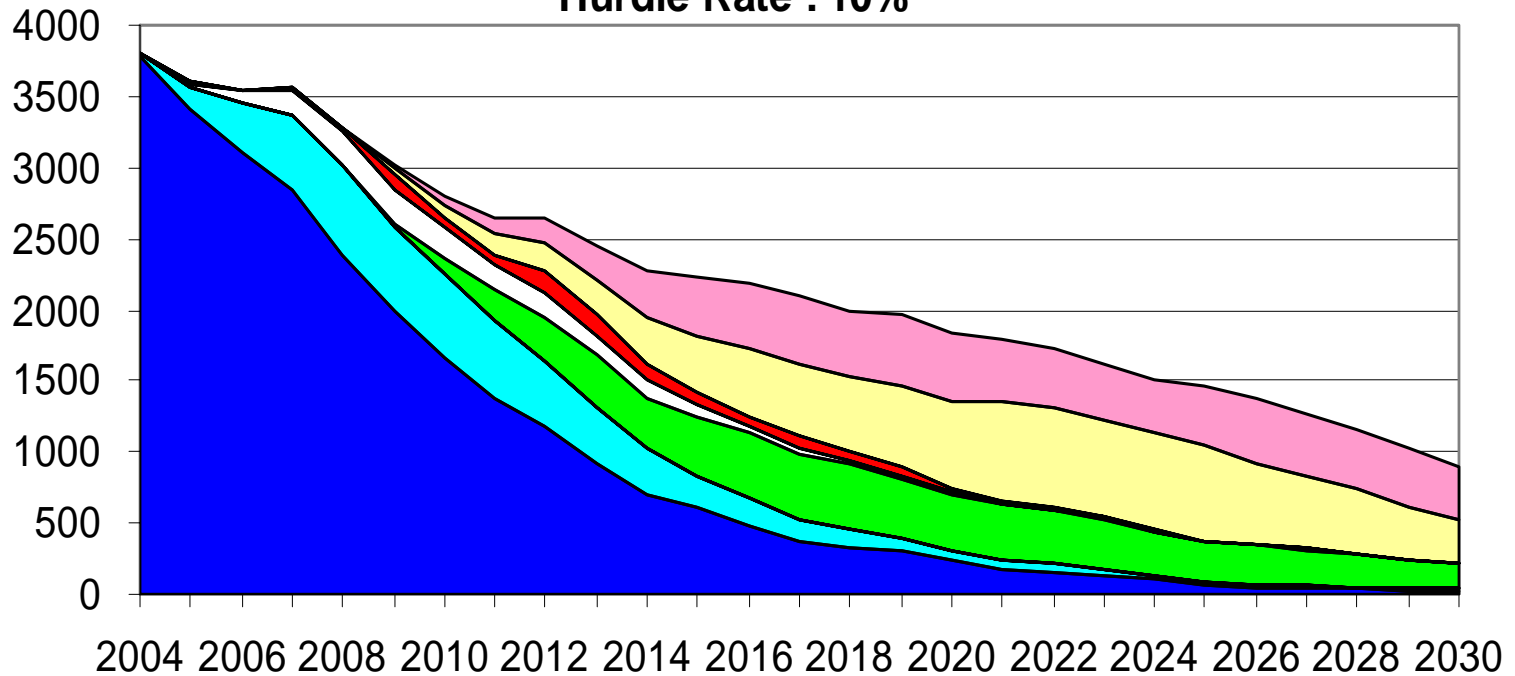


Potential Gas Production \$40/bbl and 36p/therm Hurdle Rate : 10%



Potential Hydrocarbon Production
 \$20/bbl and 18p/therm
 Hurdle Rate : 10%

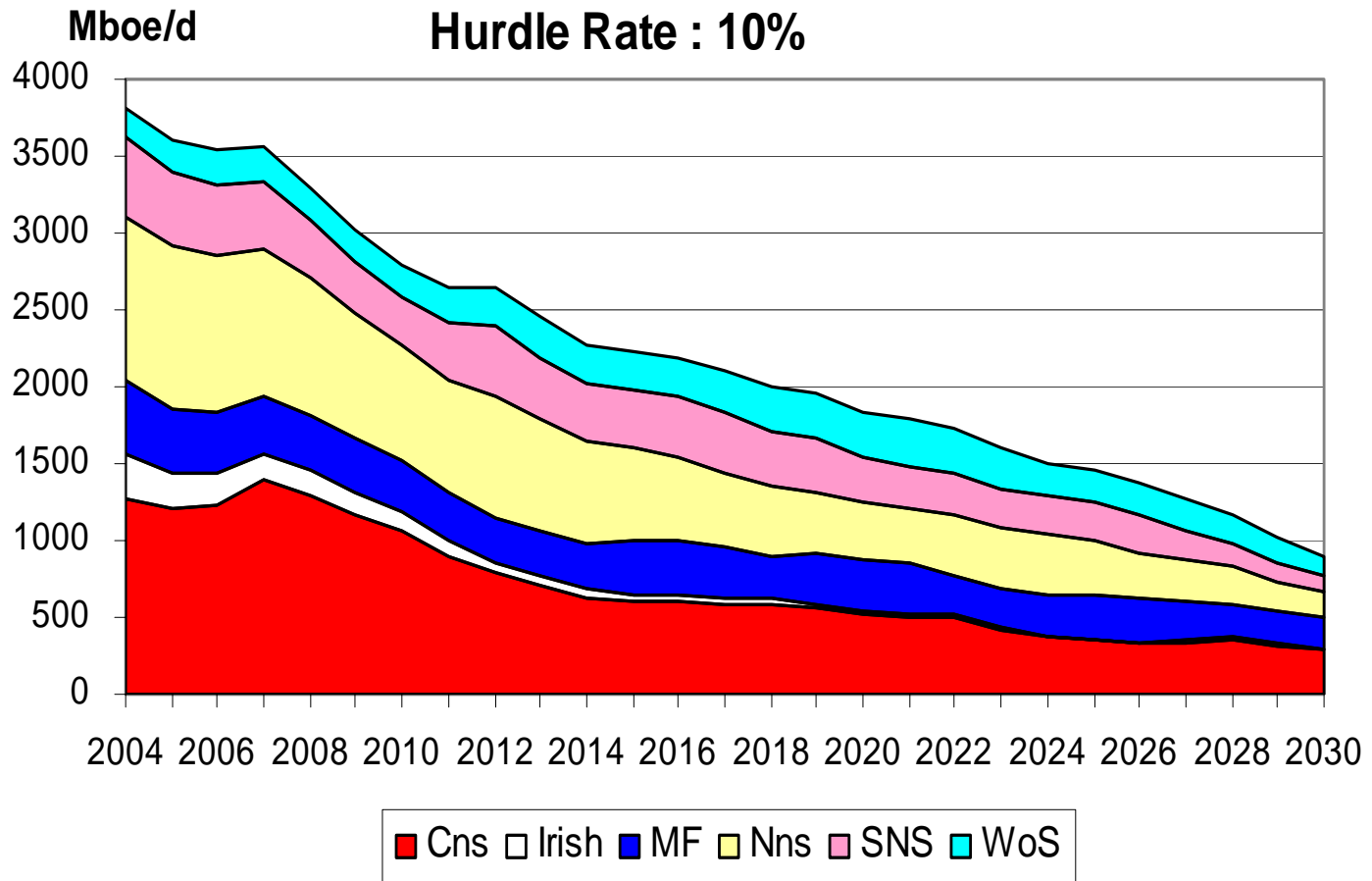
Mboe/d



- Sanctioned ■ Current Incremental ■ Future Incremental □ Probable
- Possible ■ Technical Reserves ■ New Exploration

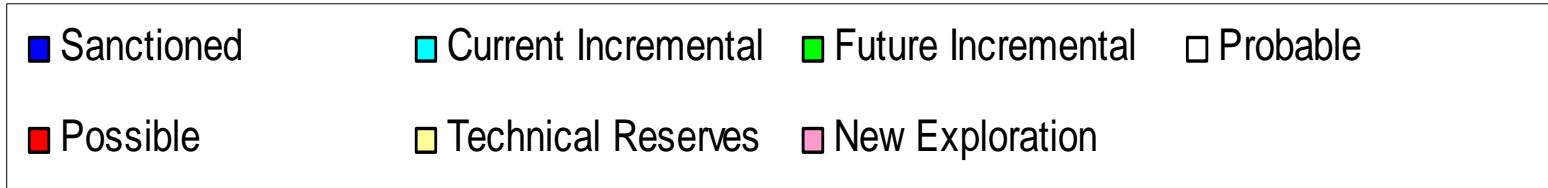
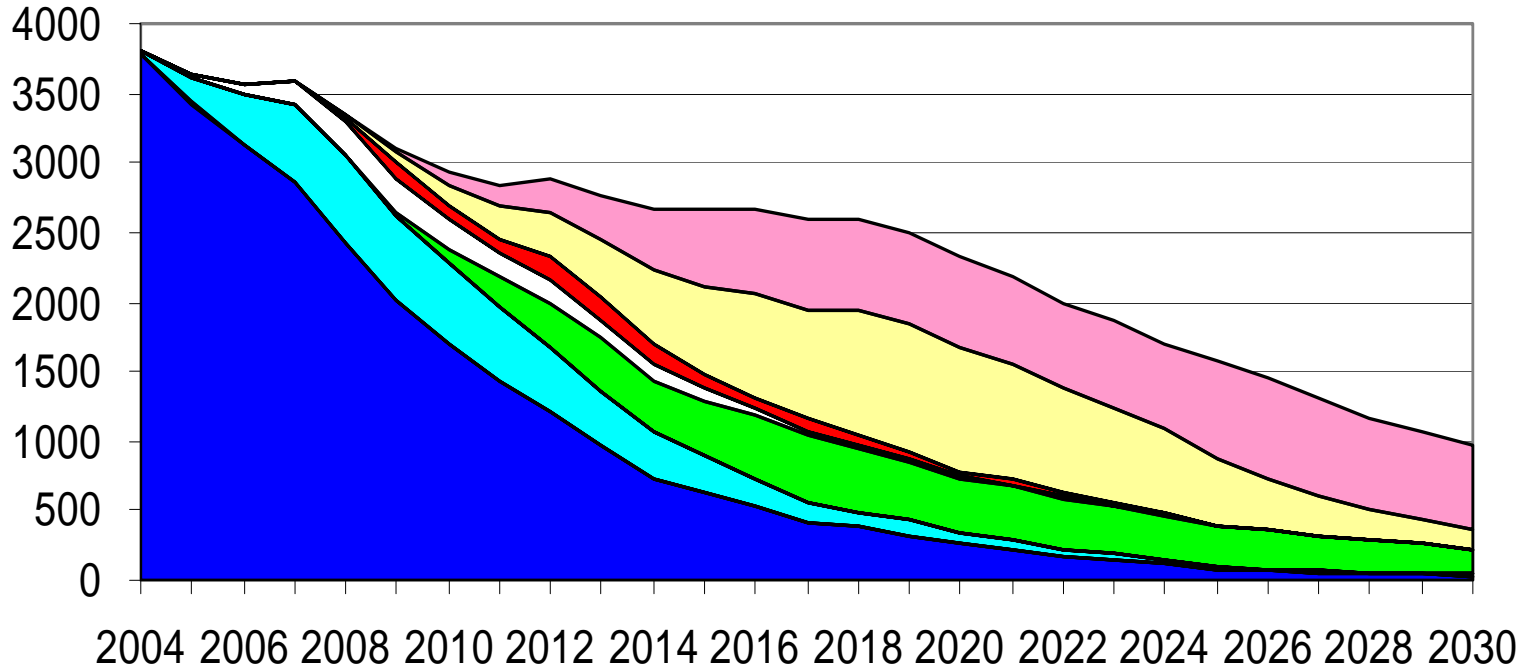
Potential Hydrocarbon Production \$20/bbl and 18p/therm

Hurdle Rate : 10%



Potential Hydrocarbon Production
\$30/bbl and 28p/therm
Hurdle Rate : 10%

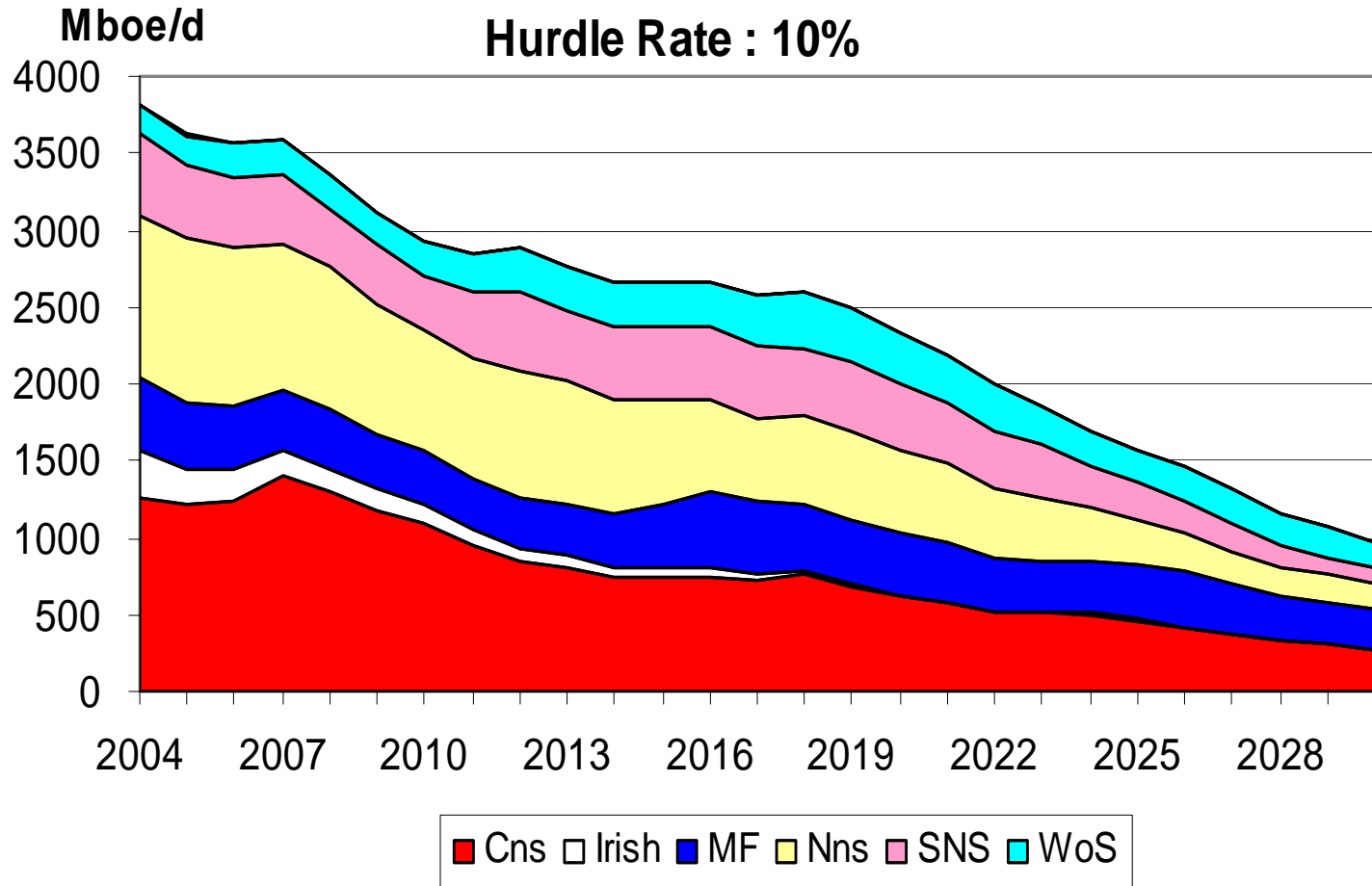
Mboe/d



Potential Hydrocarbon Production

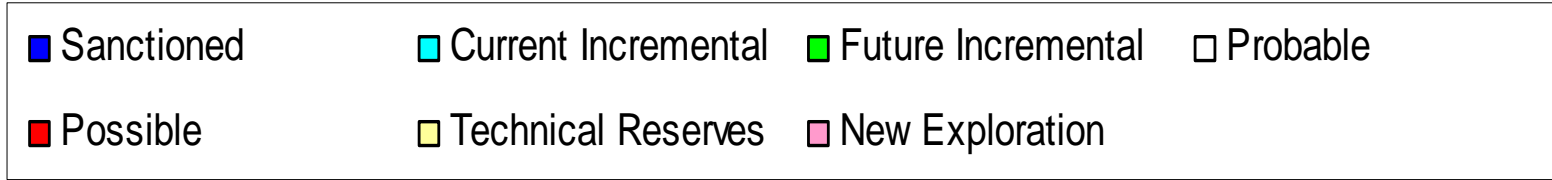
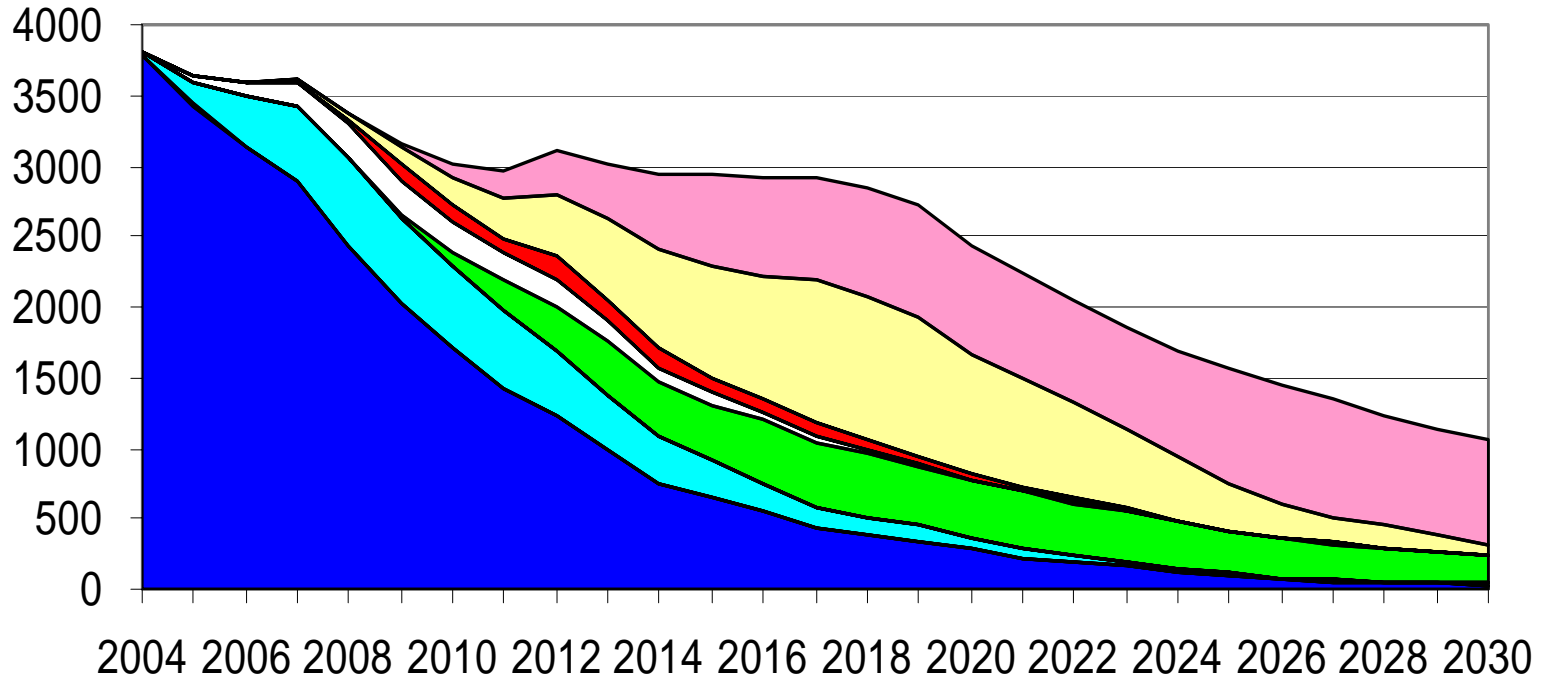
\$30/bbl and 28p/therm

Hurdle Rate : 10%

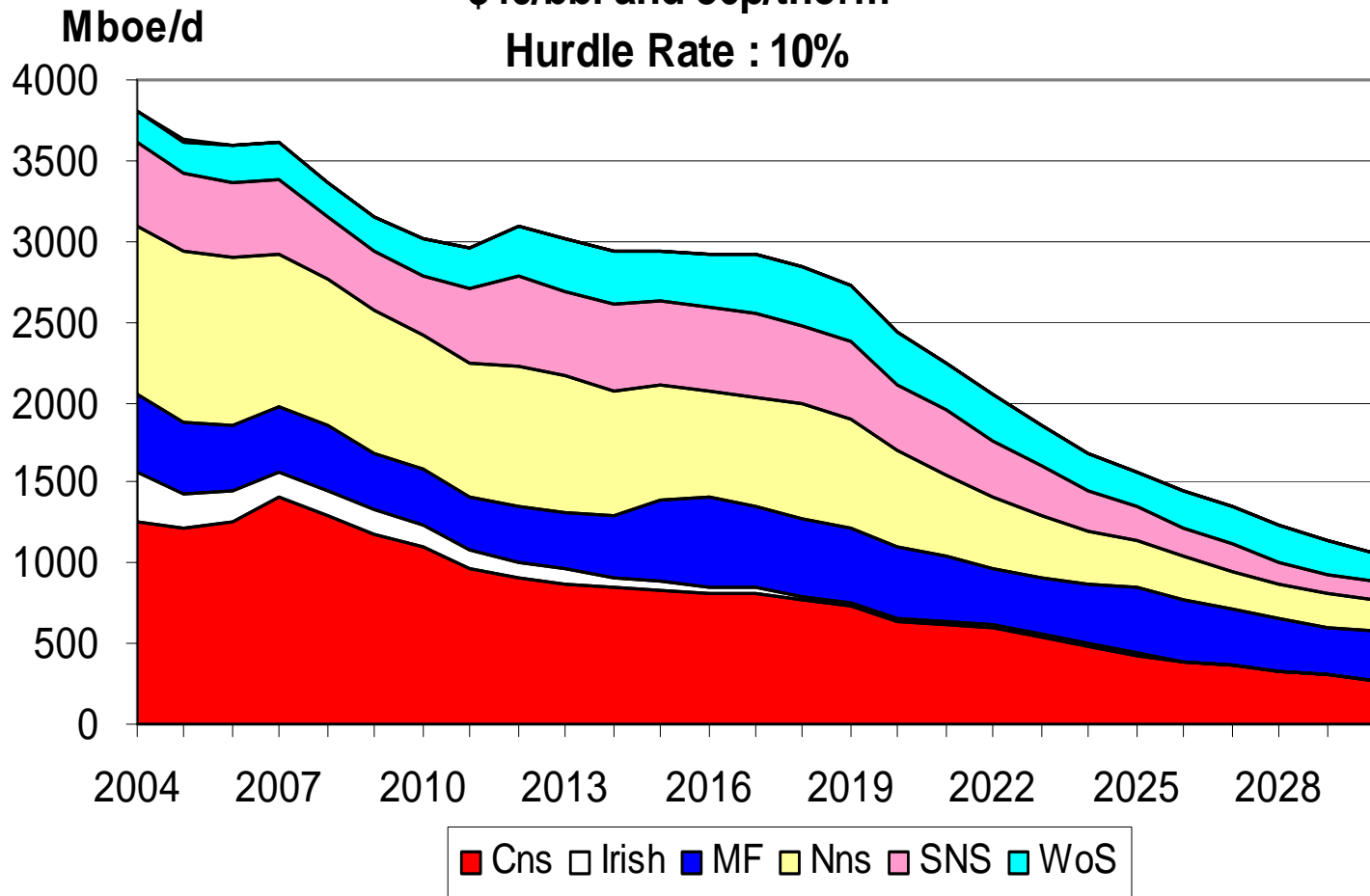


Potential Hydrocarbon Production
\$40/bbl and 36p/therm
Hurdle Rate : 10%

Mboe/d



Potential Hydrocarbon Production \$40/bbl and 36p/therm Hurdle Rate : 10%



Cumulative Potential Production from 2005 to 2030 (bn boe)

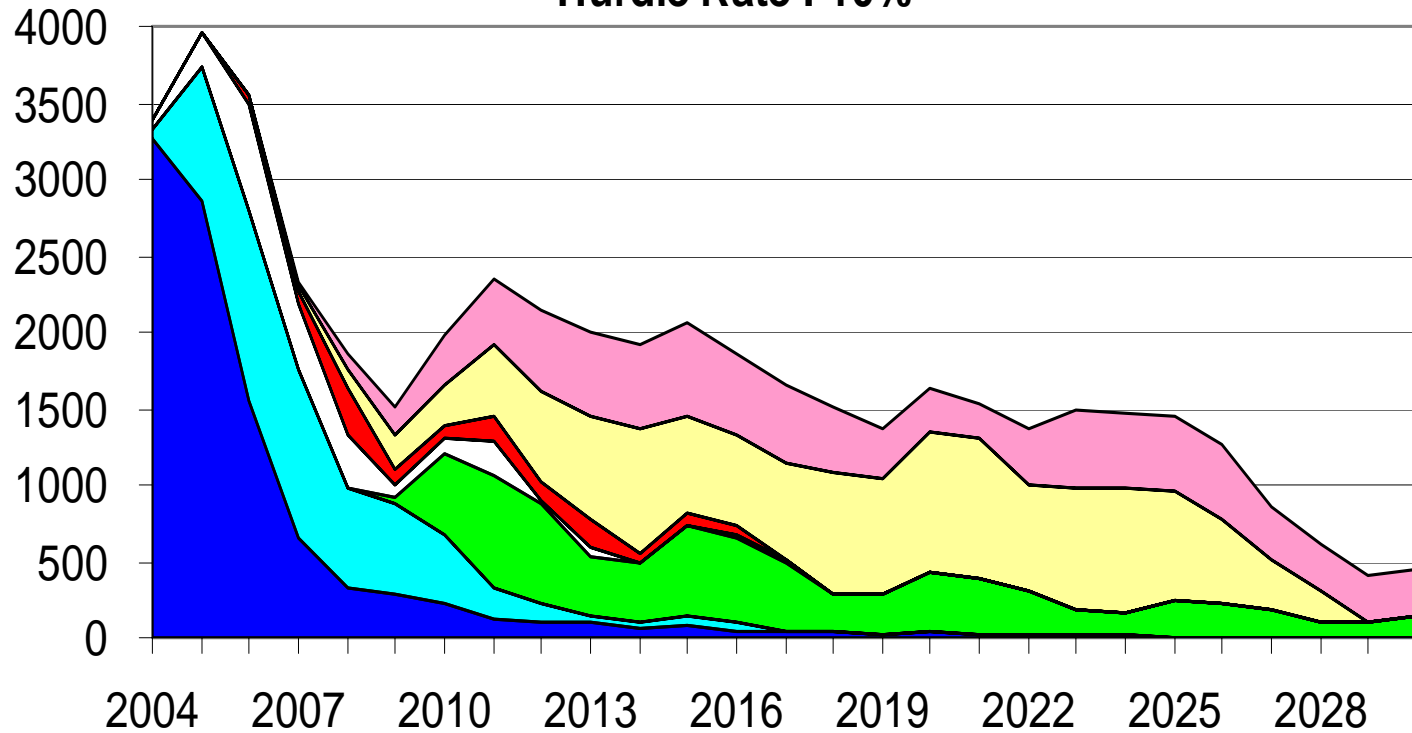
Sanctioned		Current Incremental	Future Incremental (all fields)	Probable (excluding incremental)	Possible (excluding incremental)	Technical Reserves (excluding incremental)	New Exploration (excluding incremental)	Aggregate
\$20	9.7	2.10	2.48	0.70	0.5	3.6	2.9	20.4
\$30	9.9	2.11	2.51	0.70	0.5	4.1	4.2	22.6
\$40	10	2.13	2.52	0.71	0.5	4.2	5.0	23.6

Potential Real Development Costs

\$20/bbl and 18p/therm

Hurdle Rate : 10%

£m Real 2005



■ Sanctioned
■ Possible

■ Current Incremental
■ Technical Reserves

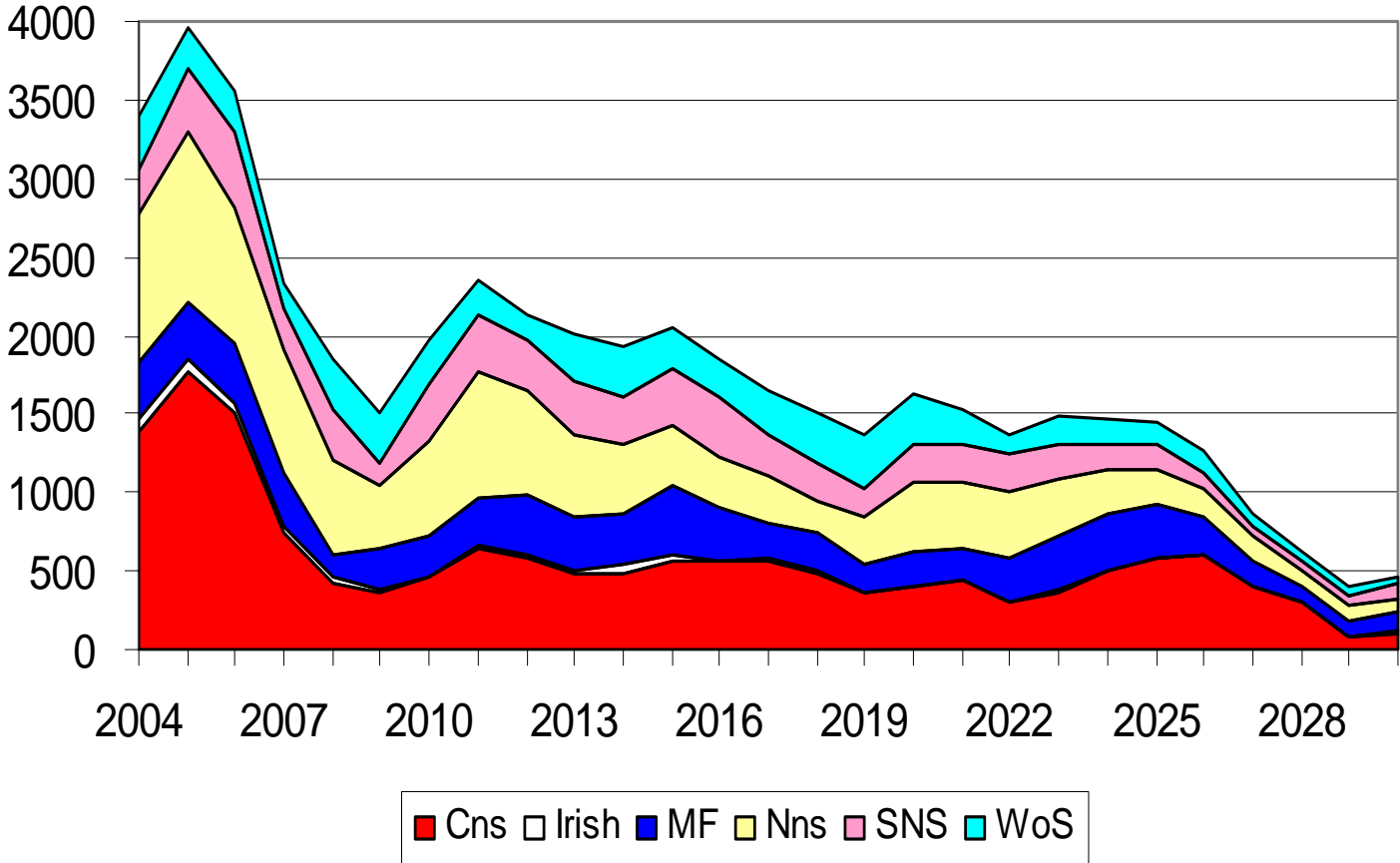
■ Future Incremental
■ New Exploration

□ Probable



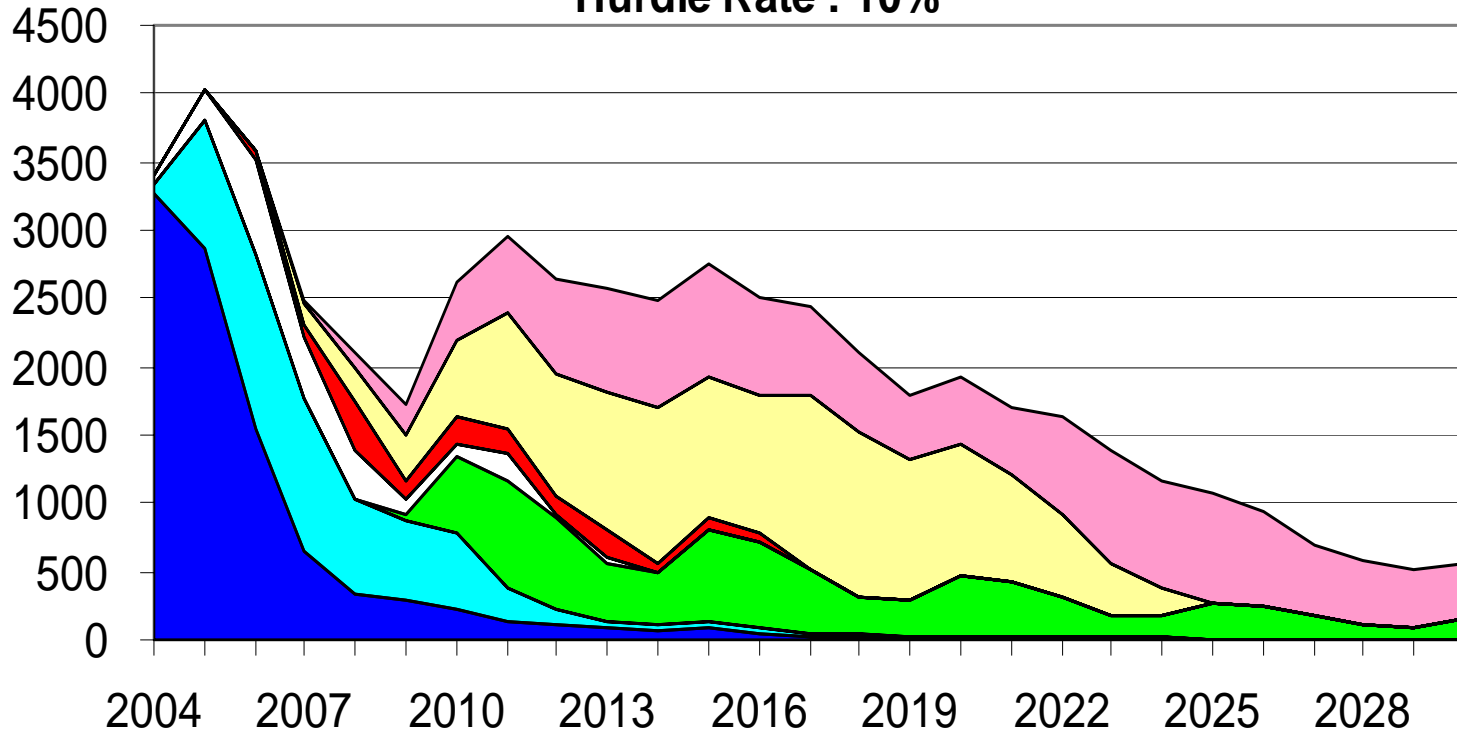
Potential Real Development Costs
\$20/bbl and 18p/therm
Hurdle Rate : 10%

£m Real 2005



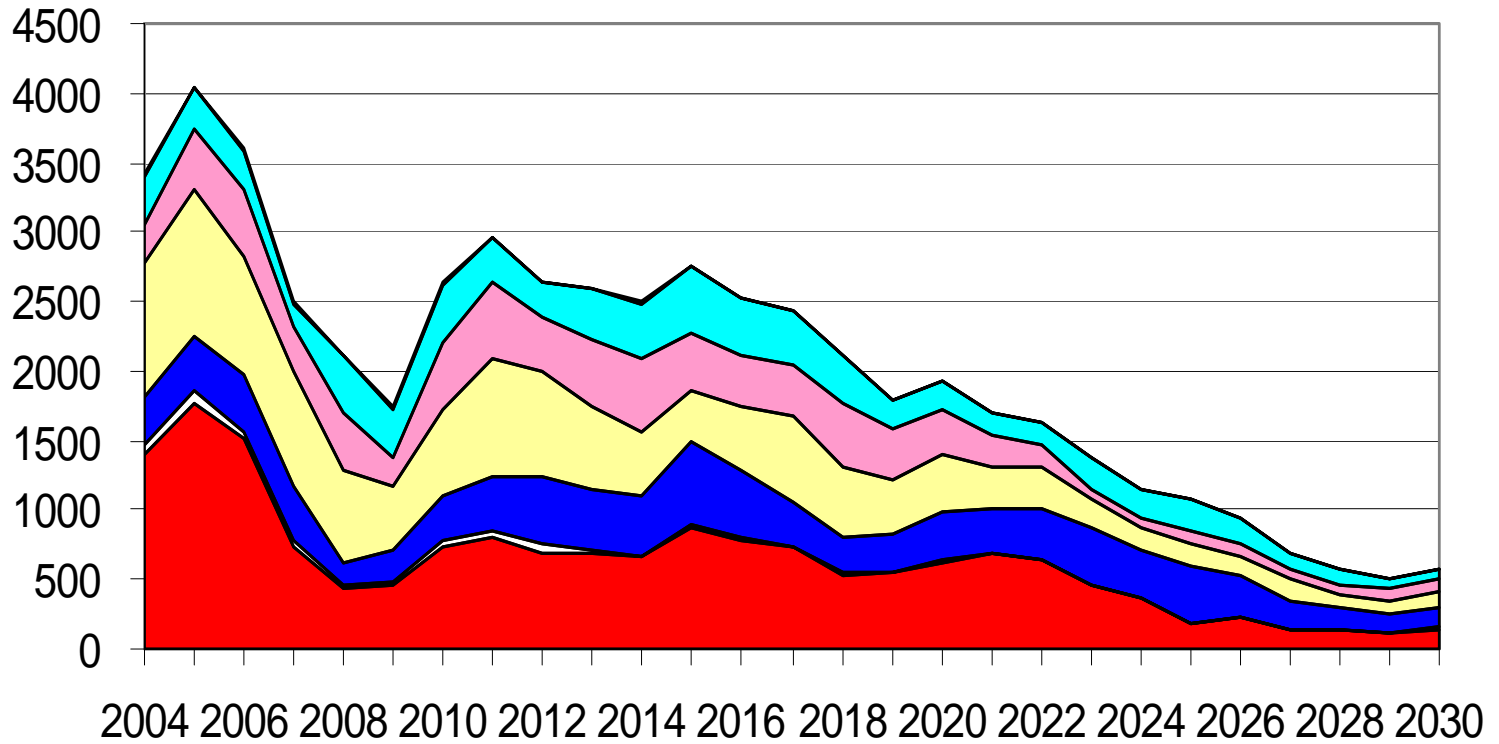
Potential Real Development Costs
 \$30/bbl and 28p/therm
 Hurdle Rate : 10%

£m Real 2005



Potential Real Development Costs
 \$30/bbl and 28p/therm
 Hurdle Rate : 10%

£m Real 2005

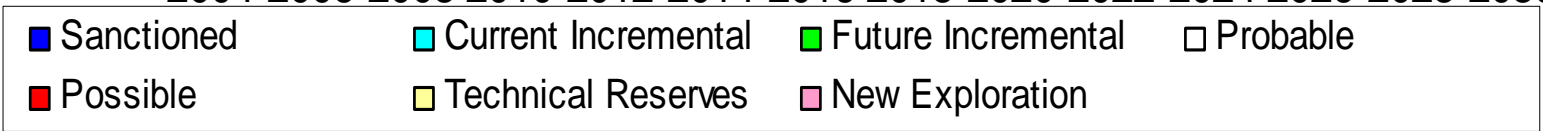
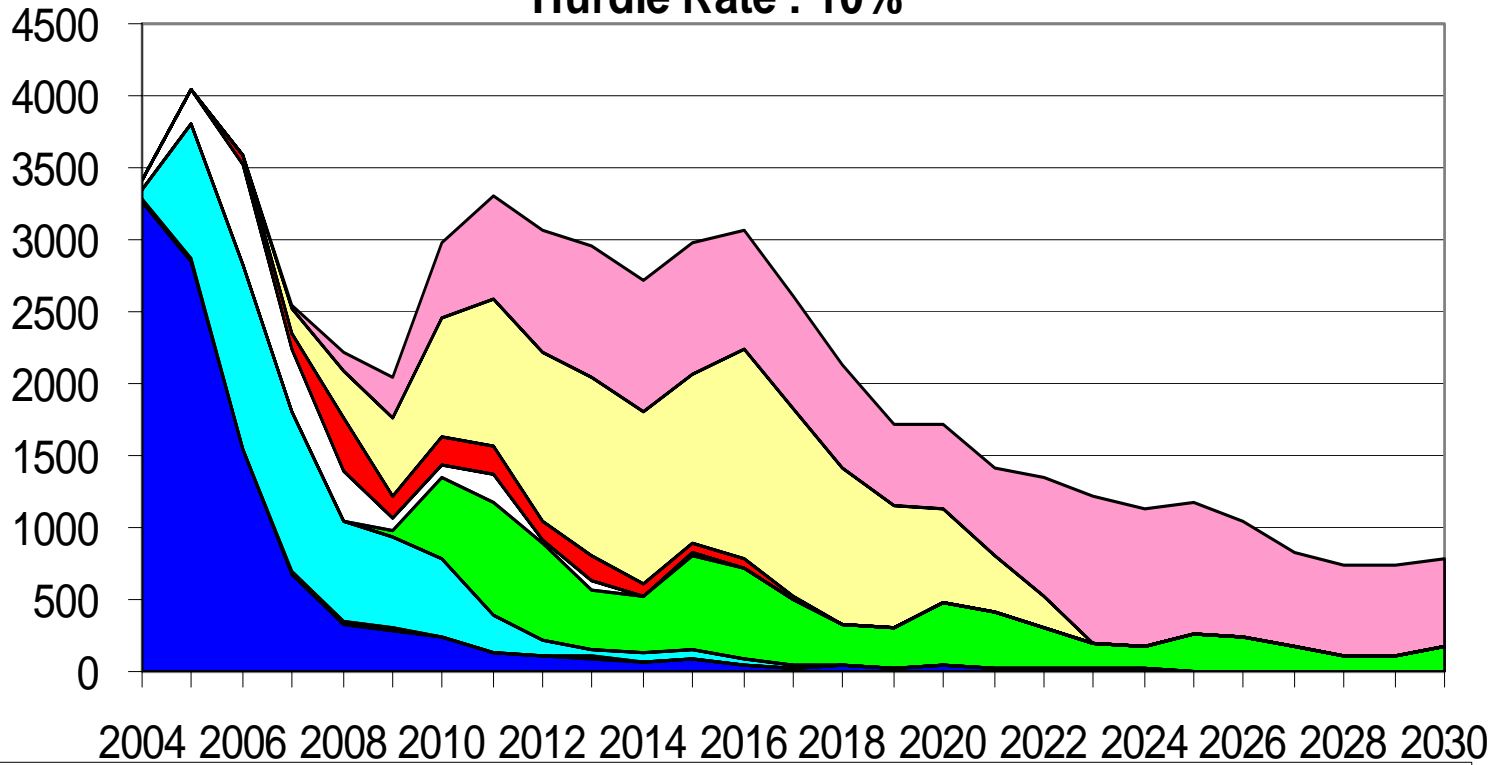


Potential Real Development Costs

\$40/bbl and 36p/therm

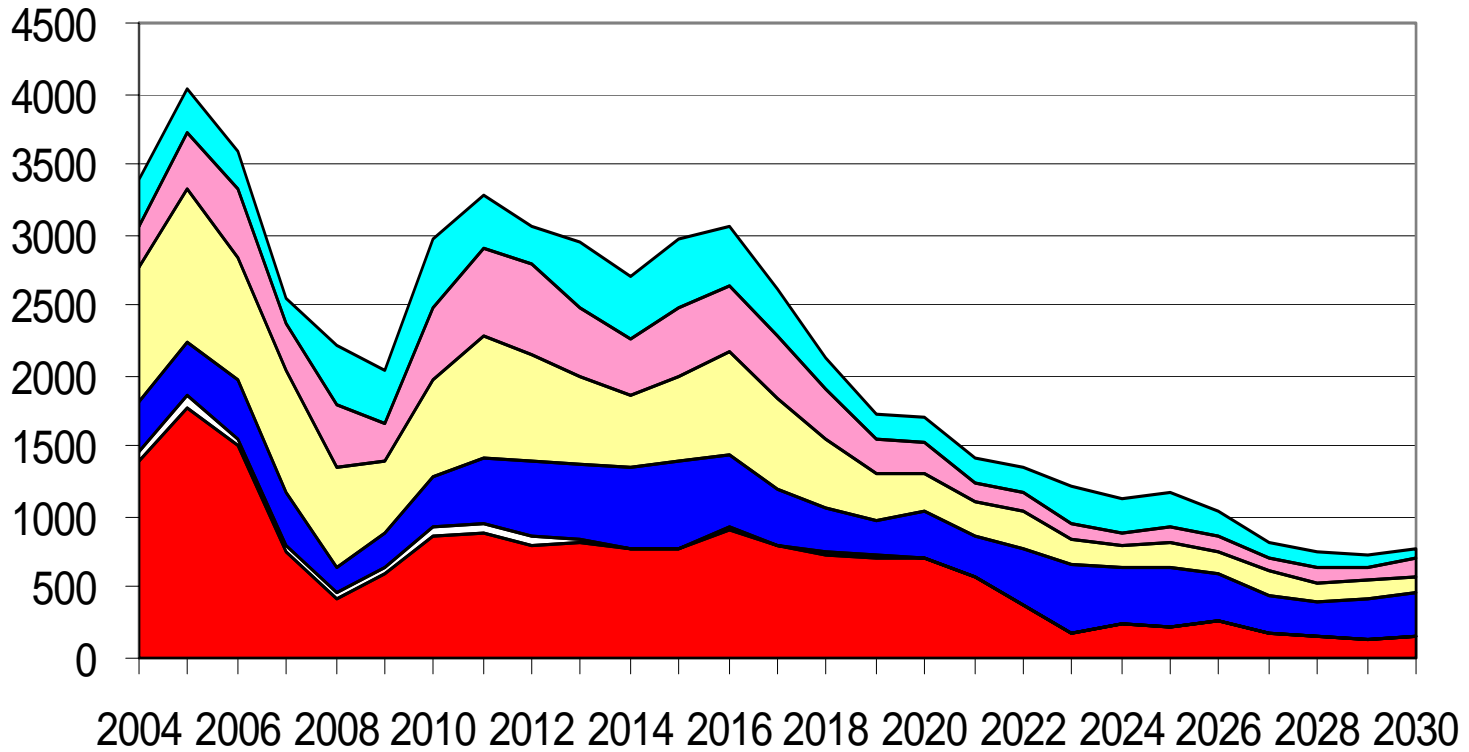
Hurdle Rate : 10%

£m Real 2005



Potential Real Development Costs
 \$40/bbl and 36p/therm
 Hurdle Rate : 10%

£m Real 2005

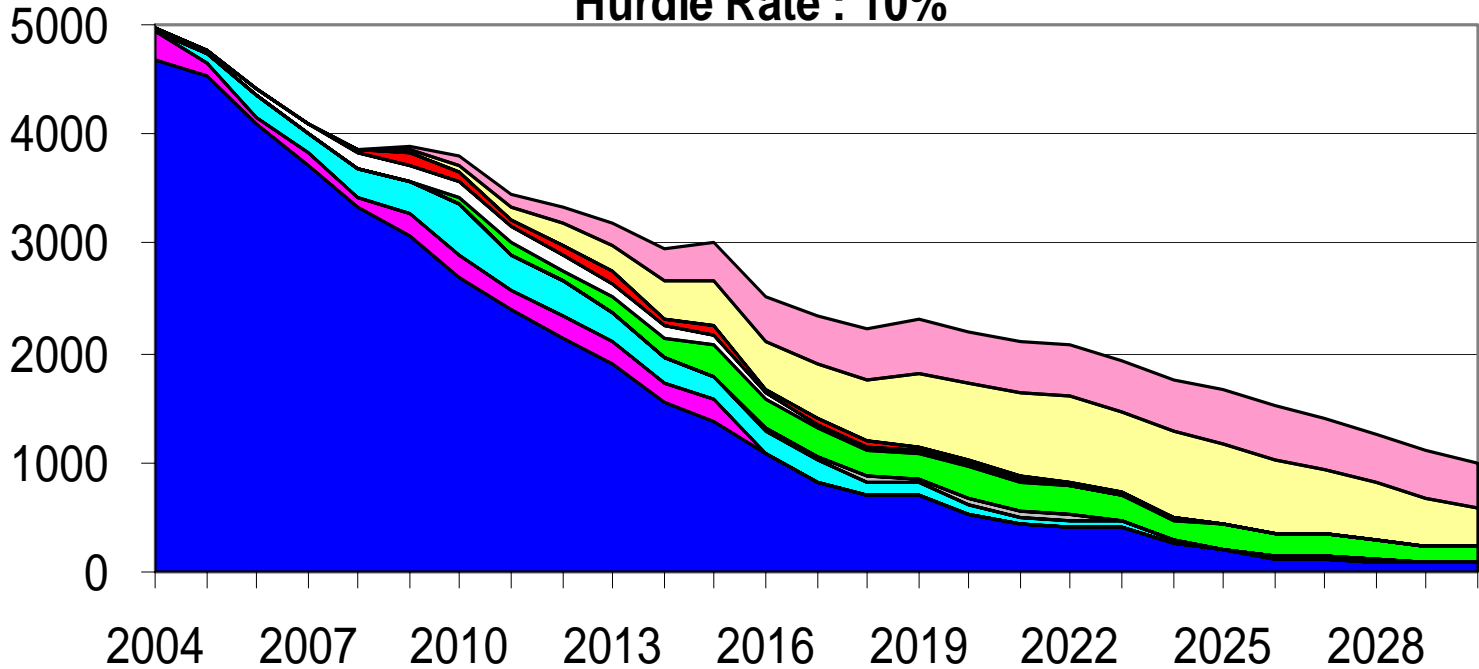


Potential Real Operating Costs

\$20/bbl and 18p/therm

Hurdle Rate : 10%

£m Real 2005



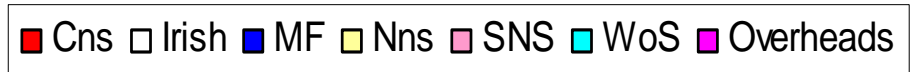
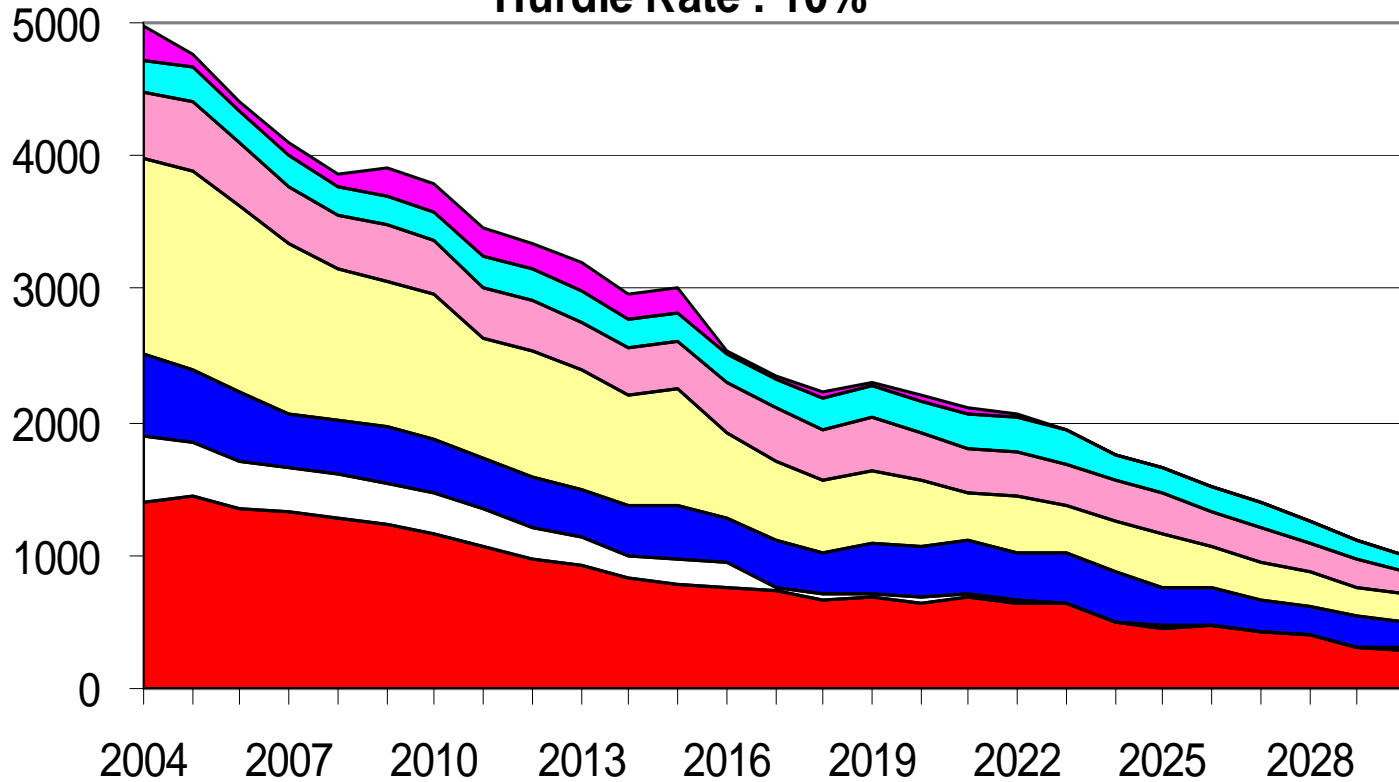
- Sanctioned
- Sanctioned Overheads
- Current Incremental
- Current Incremental Overheads
- Future Incremental
- Possible
- Probable
- Technical Reserves
- New Exploration

Potential Real Operating Costs

\$20/bbl and 18p/therm

Hurdle Rate : 10%

£m Real 2005

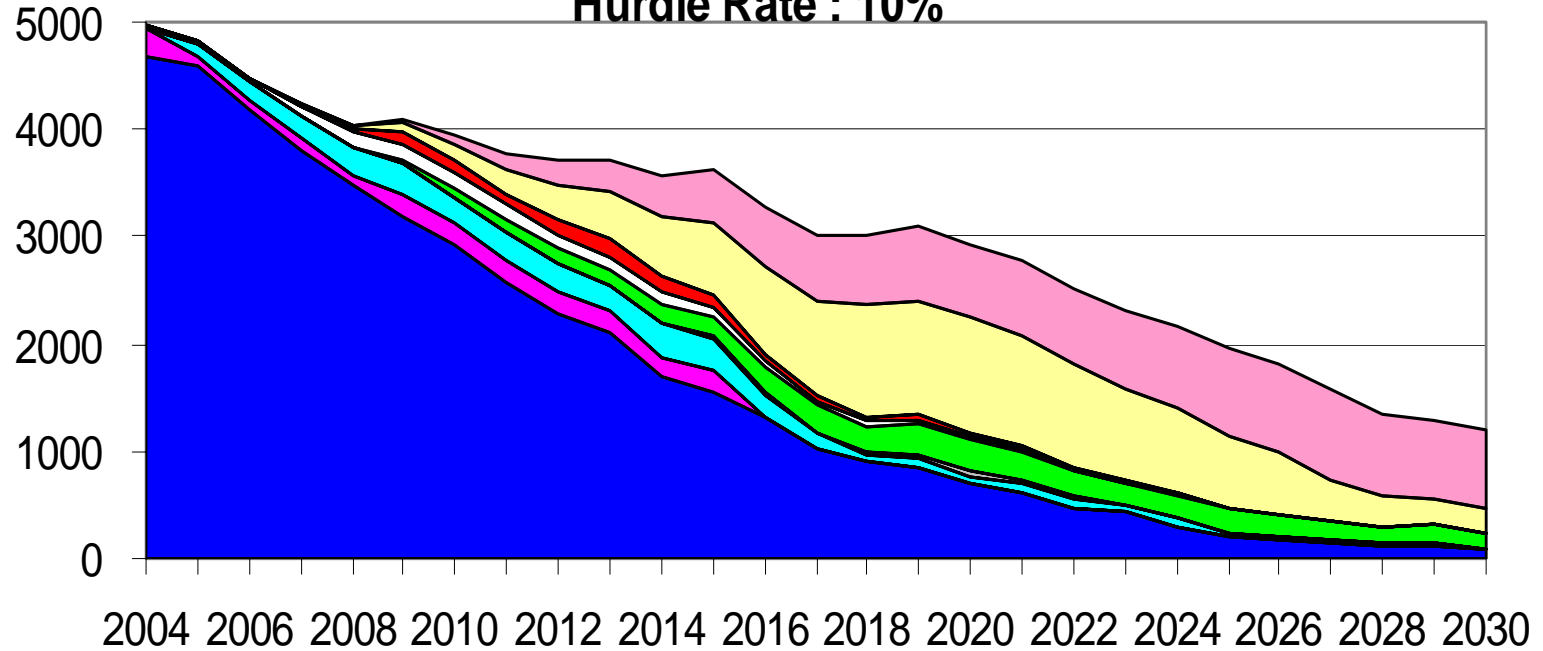


Potential Real Operating Costs

\$30/bbl and 28p/therm

Hurdle Rate : 10%

£m Real 2005



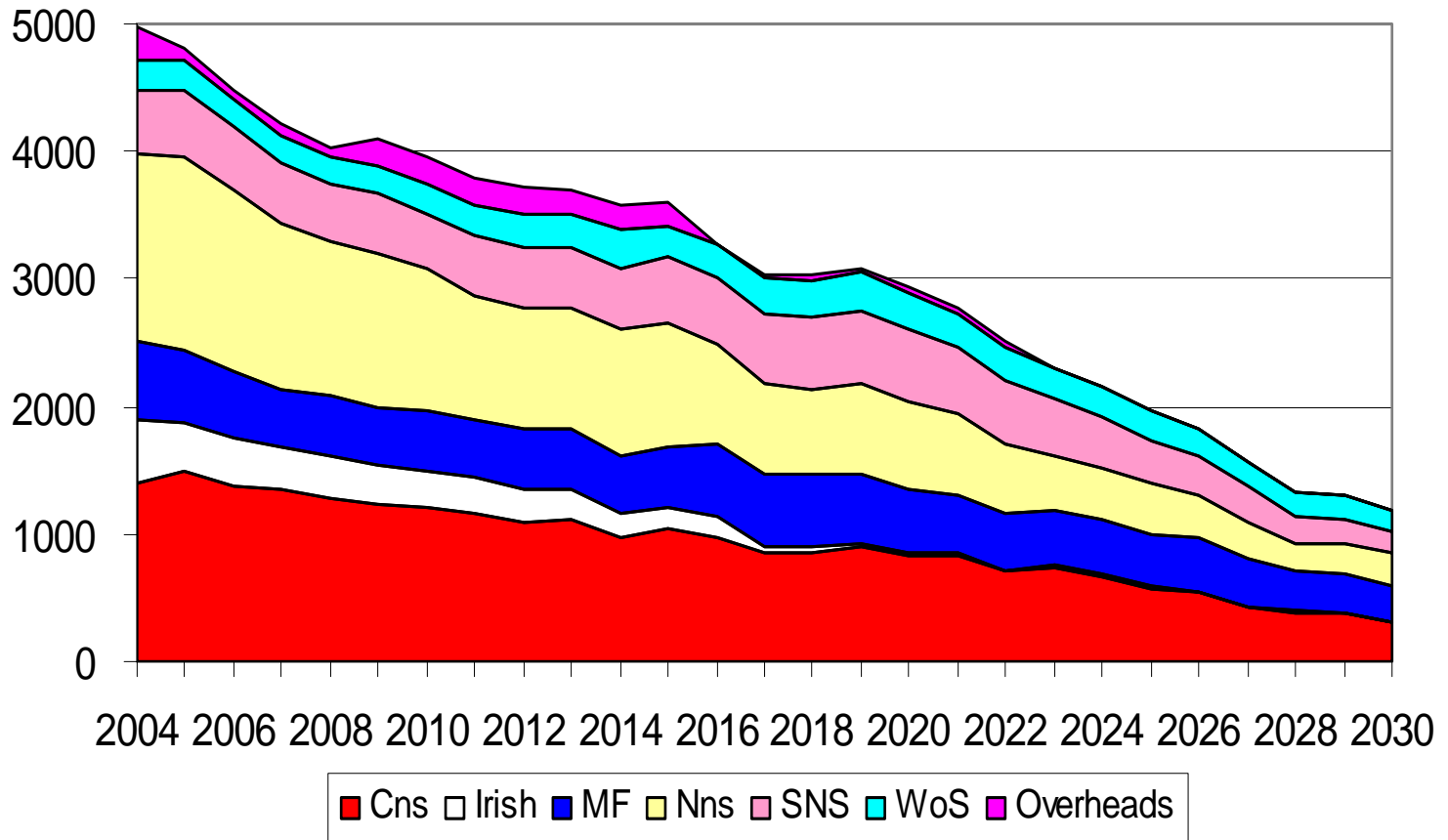
- Sanctioned
- Sanctioned Overheads
- Current Incremental
- Current Incremental Overheads
- Future Incremental
- Probable
- Possible
- Technical Reserves
- New Exploration

Potential Real Operating Costs

\$30/bbl and 28p/therm

Hurdle Rate : 10%

£m Real 2005

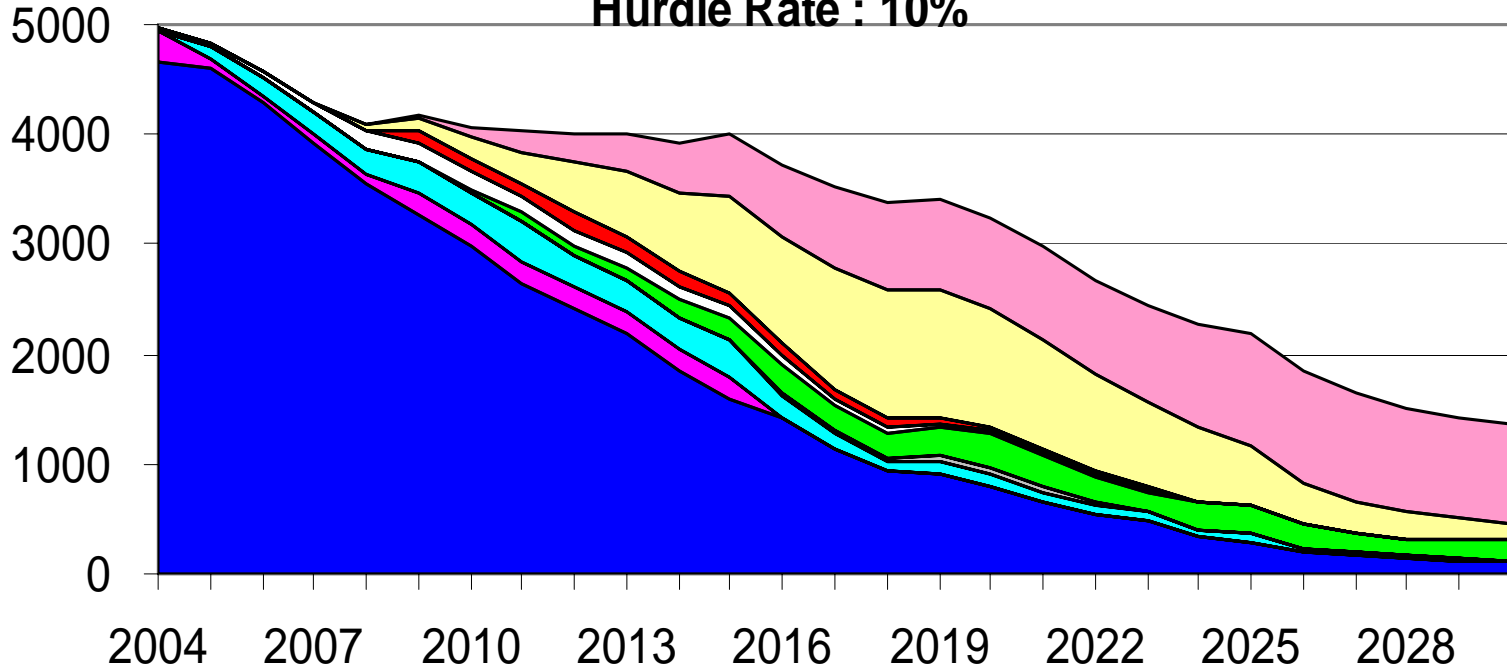


Potential Real Operating Costs

\$40/bbl and 36p/therm

Hurdle Rate : 10%

£m Real 2005



- Sanctioned
- Current Incremental
- Future Incremental
- Possible
- New Exploration
- Sanctioned Overheads
- Current Incremental Overheads
- Probable
- Technical Reserves

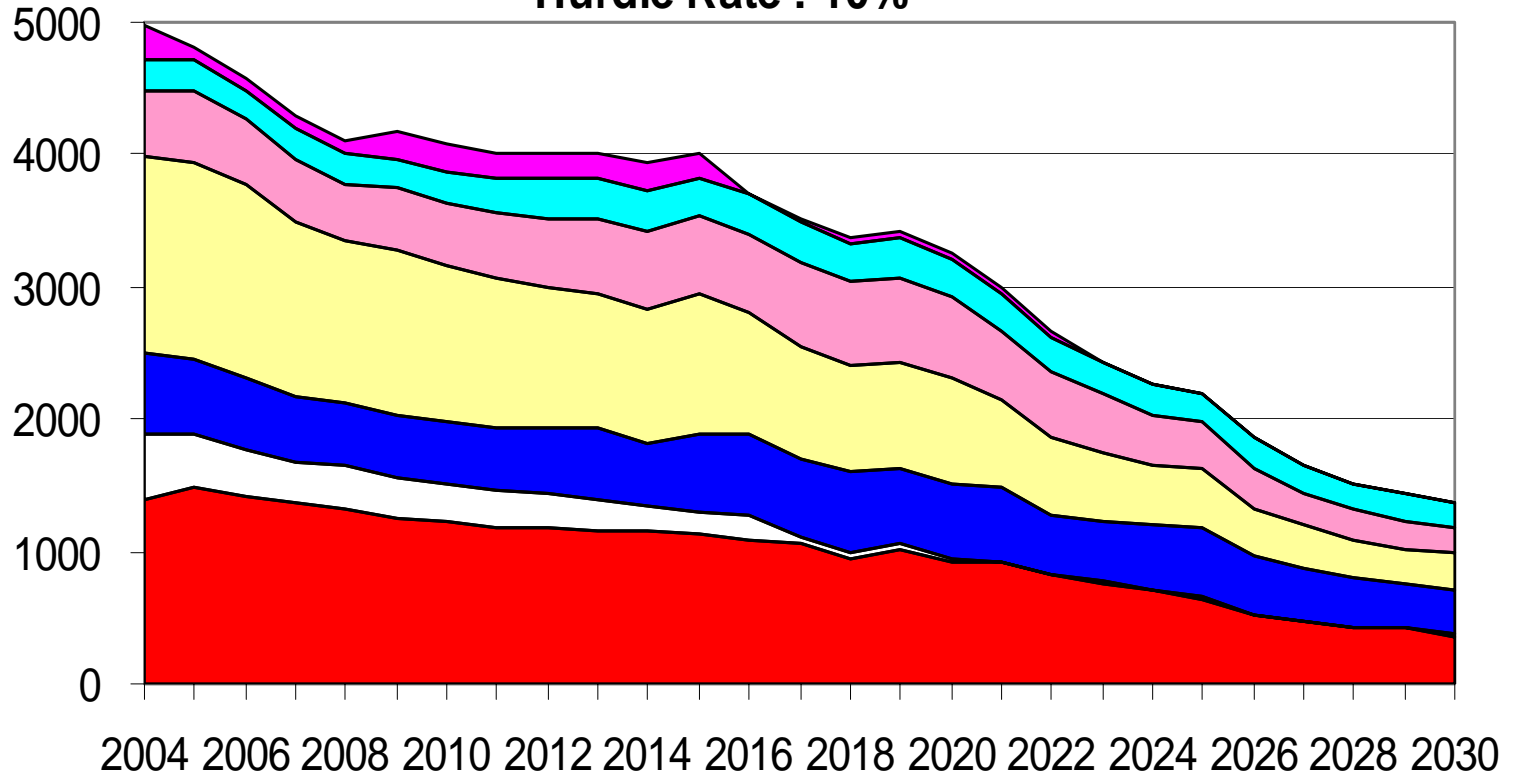


Potential Real Operating Costs

\$40/bbl and 36p/therm

Hurdle Rate : 10%

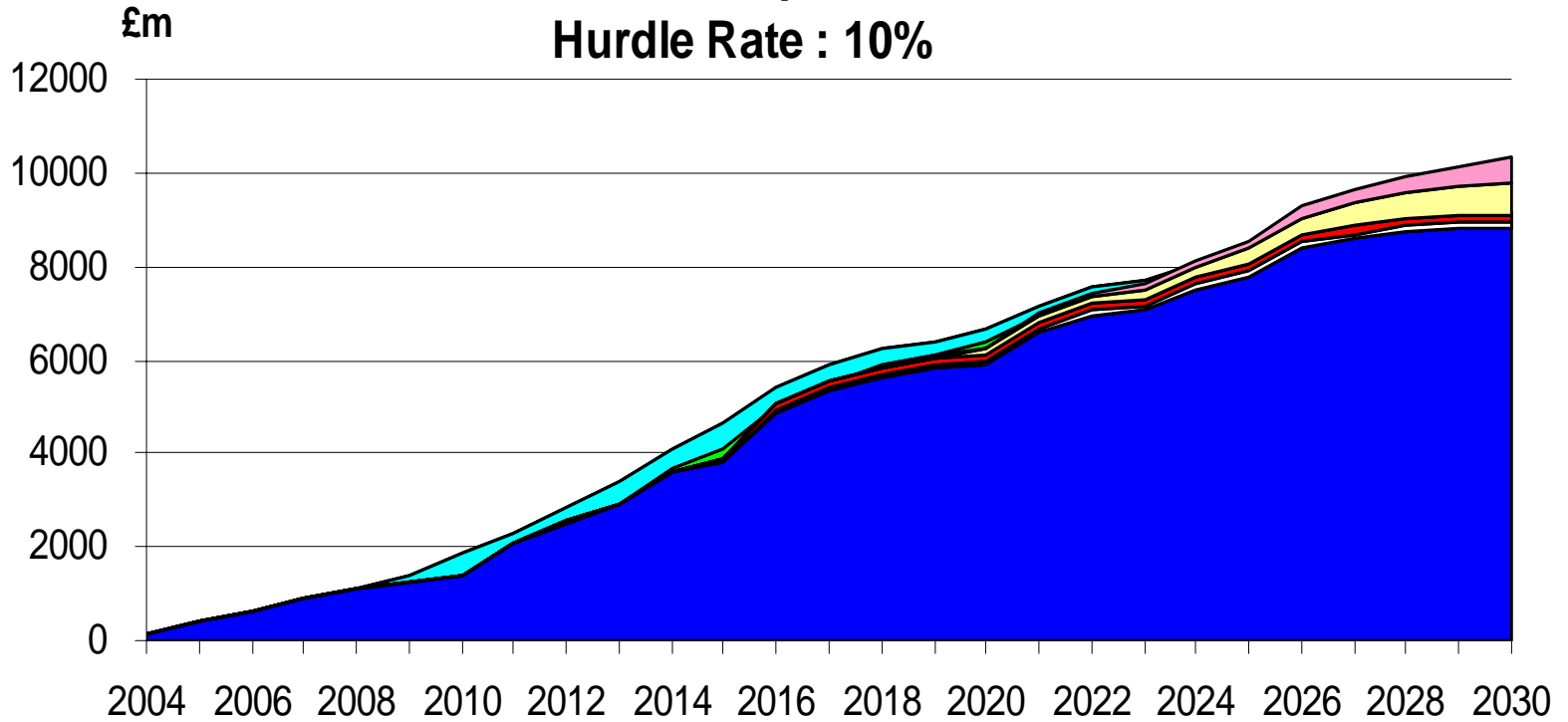
£m Real 2005



Potential Cummulative Decommissioning Costs

\$20/bbl 18p/therm

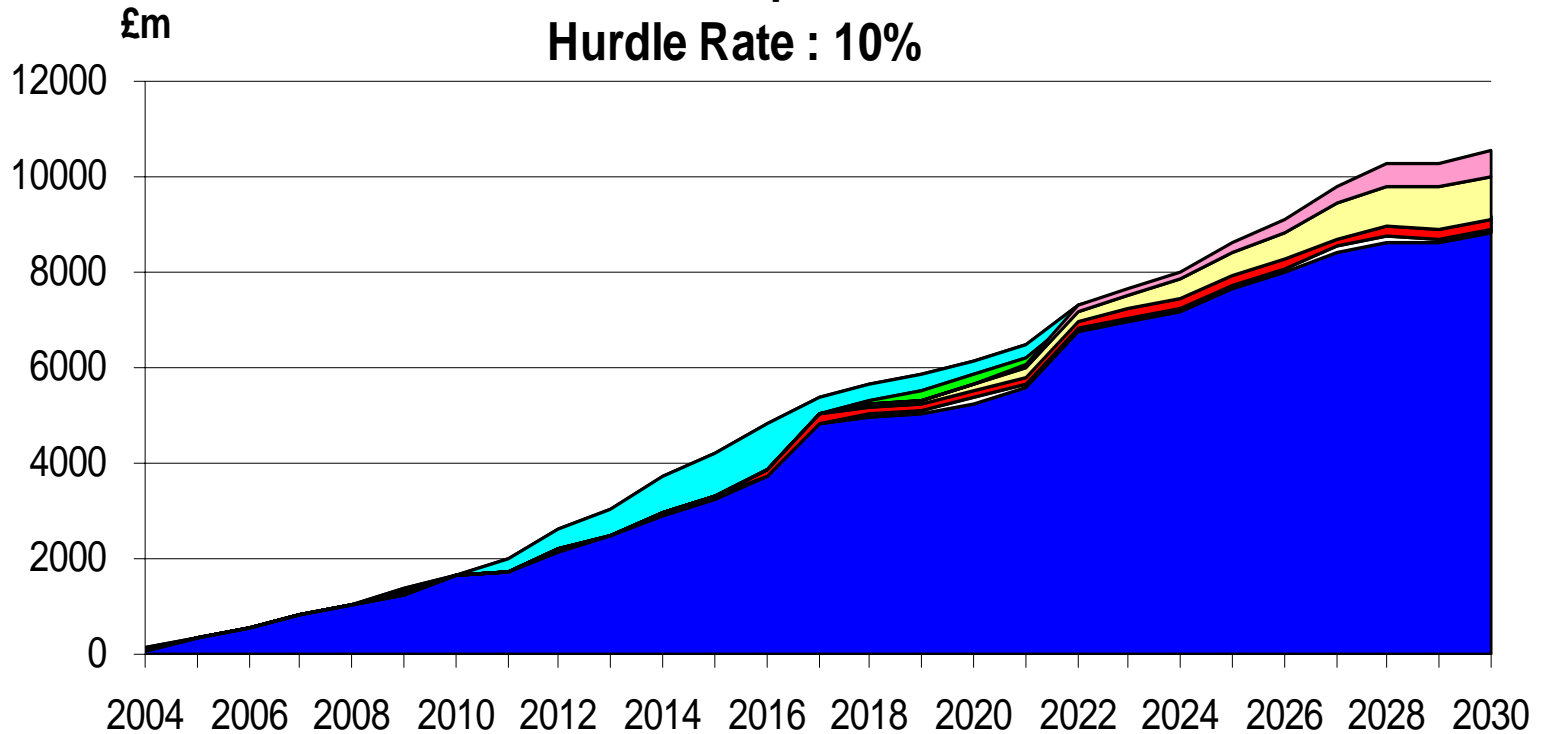
Hurdle Rate : 10%



Potential Cummulative Decommissioning Costs

\$30/bbl 28p/therm

Hurdle Rate : 10%

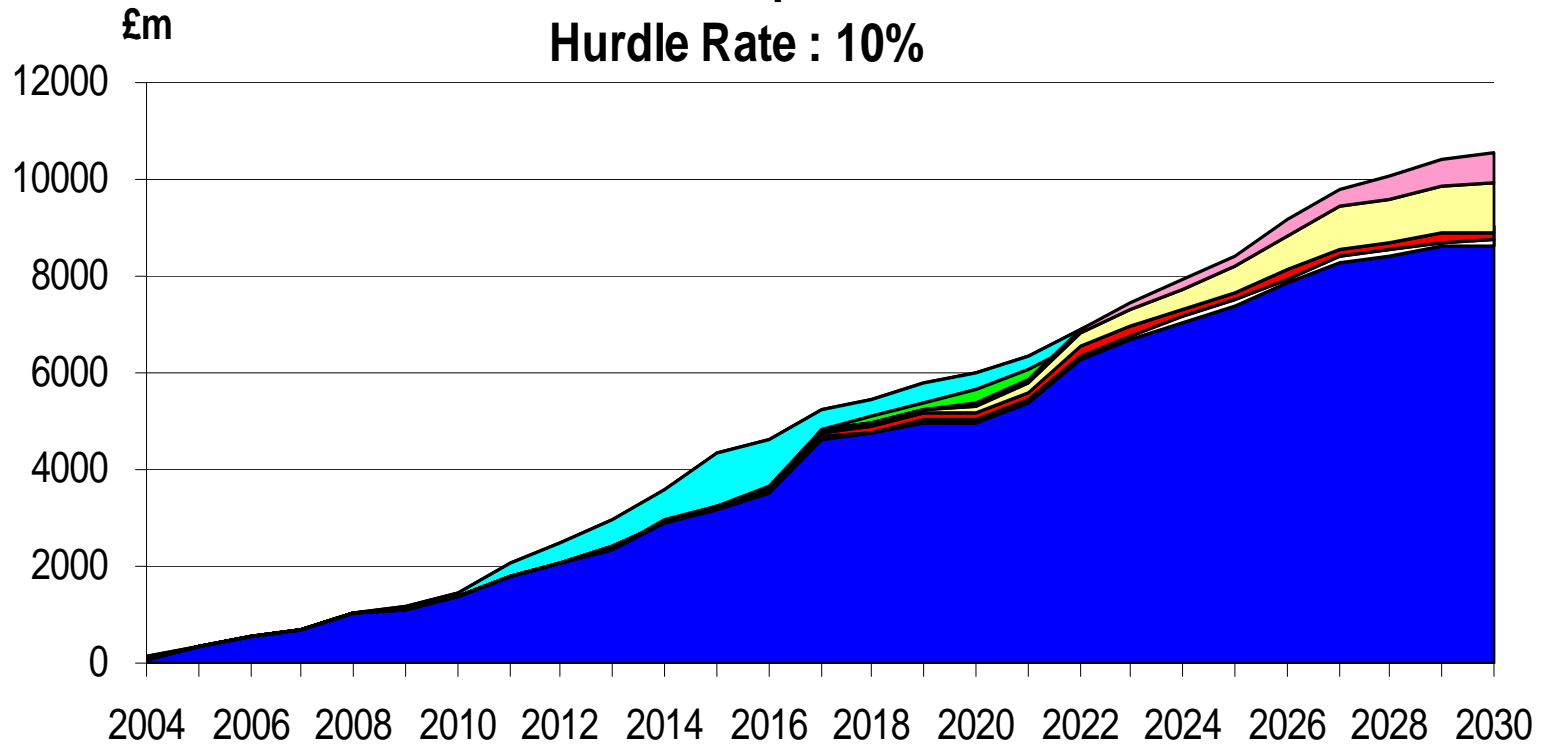


- Sanctioned
- Current Incremental
- Future Incremental
- Probable
- Possible
- Technical Reserves
- New Exploration

Potential Cummulative Decommissioning Costs

\$40/bbl 36p/therm

Hurdle Rate : 10%



■ Sanctioned

■ Current Incremental

■ Future Incremental

□ Probable

■ Possible

■ Technical Reserves

■ New Exploration



Conclusions

1. Substantial remaining potential.
2. Pilot target of 3 mmboe/d in 2010 is challenging (as is 2 mmboe/d in 2020).
3. Attainment of longer term potential depends on Success of Pilot/DTI initiatives relating to:
 - a. Fallow fields/blocks
 - b. Infrastructure code of practice
 - c. Brownfields (including stewardship)
 - d. Facilitation of asset transactions including decommissioning liability problem
4. Prolongation of infrastructure life needed for development of fields in long term.