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**The Budget 2009 Tax Proposals and Activity in the  
UK Continental Shelf (UKCS)**

Professor Alexander G. Kemp and  
Linda Stephen

June, 2009

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**DEPARTMENT OF ECONOMICS**

## **NORTH SEA ECONOMICS**

Research in North Sea Economics has been conducted in the Economics Department since 1973. The present and likely future effects of oil and gas developments on the Scottish economy formed the subject of a long term study undertaken for the Scottish Office. The final report of this study, The Economic Impact of North Sea Oil on Scotland, was published by HMSO in 1978. In more recent years further work has been done on the impact of oil on local economies and on the barriers to entry and characteristics of the supply companies in the offshore oil industry.

The second and longer lasting theme of research has been an analysis of licensing and fiscal regimes applied to petroleum exploitation. Work in this field was initially financed by a major firm of accountants, by British Petroleum, and subsequently by the Shell Grants Committee. Much of this work has involved analysis of fiscal systems in other oil producing countries including Australia, Canada, the United States, Indonesia, Egypt, Nigeria and Malaysia. Because of the continuing interest in the UK fiscal system many papers have been produced on the effects of this regime.

From 1985 to 1987 the Economic and Social Science Research Council financed research on the relationship between oil companies and Governments in the UK, Norway, Denmark and The Netherlands. A main part of this work involved the construction of Monte Carlo simulation models which have been employed to measure the extents to which fiscal systems share in exploration and development risks.

Over the last few years the research has examined the many evolving economic issues generally relating to petroleum investment and related fiscal and regulatory matters. Subjects researched include the economics of incremental investments in mature oil fields, economic aspects of the CRINE initiative, economics of gas developments and contracts in the new market situation, economic and tax aspects of tariffing, economics of infrastructure cost sharing, the effects of comparative petroleum fiscal systems on incentives to develop fields and undertake new exploration, the oil price responsiveness of the UK petroleum tax system, and the economics of decommissioning, mothballing and re-use of facilities. This work has been financed by a group of oil companies and Scottish Enterprise, Energy. The work on CO<sub>2</sub> Capture, EOR and storage is also financed by a grant from the Natural Environmental Research Council (NERC).

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- b) Least-Cost Transportation Network for CO<sub>2</sub> in UK/UKCS
- c) Comparative study of Petroleum Taxation in North West Europe/ North Atlantic (UK, Norway, Denmark, Netherlands, Ireland, Faroe Islands, Iceland and Greenland)
- d) Economics of Decommissioning in the UKCS: Further Analysis
- e) Economics of Gas Exploitation from West of Shetland

- f) Prospective Activity levels in the UKCS to 2035
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# **The Budget 2009 Tax Proposals and Activity in the UK Continental Shelf (UKCS)**

Professor Alexander G. Kemp  
And  
Linda Stephen

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**The Budget 2009 Tax Proposals and Activity in the UK**  
**Continental Shelf (UKCS)**

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**1. Introduction**

In Budget 2009 several proposals were made to modify the tax system applied to the UKCS. Important ones are as follows:

1. A value allowance (termed field allowance) is to be applied to new fields as follows:
  - (a) the field allowance for small fields is £75 million for fields with oil reserves (or gas equivalent) of 2.75 million tonnes or less, reducing on a straight line basis to nil for fields over 3.5 million tonnes. In any one year the maximum field allowance (for a field with total allowance of £75 million) is £15 million.
  - (b) the field allowance for ultra heavy oil fields is £800 million for fields with an American Petroleum Institute gravity below 18 degrees and a viscosity of more than 50 centipoise at reservoir temperature and pressure. In any one year the maximum field allowance is £160 million.
  - (c) the field allowance for ultra high temperature/pressure fields is £800 million for fields with a temperature of more than 176.67 degree Celsius and pressure of more than 1034 bar in the reservoir formation. In any one year the maximum field allowance is £160 million.

2. With respect to chargeable gains under the current law as it applies to ring fence the position is as follows:
  - (a) where companies swap UK or UKCS licence interests post development, a chargeable gain can potentially arise,
  - (b) where ring fence assets are disposed of, and the proceeds reinvested in other ring fence assets, the chargeable gain arising from the disposal can be 'held over' for up to 10 years before coming into charge.

The new rules for the calculation of chargeable gains will:

- (a) provide that no chargeable gains arise on the swap of UK/UKCS licences, to the extent that the value of one licence matches another that it has been swapped for, bringing the treatment of developed assets in line with undeveloped ones: and
  - (b) provide that where the proceeds from the disposal of a chargeable asset in the ring fence are reinvested in another chargeable ring fence asset, no chargeable gain will arise.
3. With respect to PRT licence expiry, under the current law, companies cannot access PRT relief for decommissioning costs which occur more than 12 months after they have ceased to be a licence holder in respect of a taxable field.

The new rules will:

- (a) allow companies decommissioning relief where they cease to be a participator in a field because a licence has expired,
- (b) ensure that any income that may arise in respect of the assets in question will also be chargeable to PRT.

In this paper the effects of the new field allowance are examined in detail. Comments are also made on the other proposals and on other tax issues in the UKCS not addressed in Budget 2009.

## **2. Methodology and Data**

The projections of production and expenditures have been made through the use of financial simulation modelling, including the use of the Monte Carlo technique, informed by a large, recently-updated, field database validated by the relevant operators. The field database incorporates key, best estimate information on production, and investment, operating and decommissioning expenditures. These refer to over 300 sanctioned fields, 131 incremental projects relating to these fields, 35 probable fields, and 16 possible fields. All these are as yet unsanctioned but are currently being examined for development. An additional database contains 234 fields defined as being in the category of technical reserves. Summary data on reserves (oil/gas) and block location are available for these. They are not currently being examined for development by licensees.

Monte Carlo modelling was employed to estimate the possible numbers of new discoveries in the period to 2030. The modelling incorporated assumptions based on recent trends relating to exploration effort, success rates, sizes, and types (oil, gas, condensate) of discovery. A moving



average of the behaviour of these variables over the past 5 years was calculated separately for 6 areas of the UKCS (Southern North Sea, (SNS), Central North Sea (CNS), Moray Firth (MF), Northern North Sea (NNS), West of Scotland (WOS), and Irish Sea (IS)), and the results employed for use in the Monte Carlo analysis. Because of the very limited data for WOS and IS over the period judgemental assumptions on success rates and average sizes of discoveries were made for the modelling.

It is postulated that the exploration effort depends substantially on a combination of (a) the expected success rate, (b) the likely size of discovery, and (c) oil/gas prices. In the present study 3 future oil/gas price scenarios were employed as follows:

<b>Table 1</b>		
<b>Future Oil and Gas Price Scenarios</b>		
	Oil Price (real) \$/bbl	Gas Price (real) pence/therm
High	80	70
Medium	60	50
Low	40	30

The postulated numbers of annual exploration wells drilled for the whole of the UKCS are as follows for 2009 and 2030:

<b>Table 2</b>		
<b>Exploration Wells Drilled</b>		
	2009	2030
High	45	35
Medium	40	32
Low	30	22

The annual numbers are modelled to decline in a linear fashion over the period.

It is postulated that success rates depend substantially on a combination of (a) recent experience, and (b) size of the effort. It is further suggested that higher effort is associated with more discoveries but with lower success rates compared to reduced levels of effort. This reflects the view that low levels of effort will be concentrated on the lowest risk prospects, and thus that higher effort involves the acceptance of higher risk. For the UKCS as a whole 3 success rates were postulated as follows with the medium one reflecting the average over the past 5 years.

<b>Table 3</b>	
<b>Success Rates for UKCS</b>	
Medium effort/Medium success rate	= 25.5%
High effort/Low success rate	= 24%
Low effort/High success rate	= 27%

It should be noted that success rates have varied considerably across sectors of the UKCS. Thus in the CNS and SNS the averages have

exceeded 30% while in the other sectors success rates have been well below the average for the whole province.

It is assumed that technological progress will maintain these success rates over the time period.

The mean sizes of discoveries made in the historic period for each of the 6 regions were calculated. They are shown in Table 4. It was then assumed that the mean size of discovery would decrease in line with recent historic experience. Such decline rates are quite modest.

Table 4	
Mean Discovery Size MMboe	
<b>SNS</b>	<b>9</b>
<b>CNS</b>	<b>25</b>
<b>NNS</b>	<b>25</b>
<b>MF</b>	<b>20</b>
<b>WoS</b>	<b>81</b>
<b>IS</b>	<b>5</b>

For purposes of the Monte Carlo modelling of new discoveries the SD was set at 50% of the mean value. In line with historic experience the size distribution of discoveries was taken to be lognormal.

Using the above information the Monte Carlo technique was employed to project discoveries in the 6 regions to 2030. For the whole period the total numbers of discoveries for the whole of the UKCS were are follows:

<b>Table 5</b>	
<b>Total Number of Discoveries to 2030</b>	
High effort/Low success rate	245
Medium Effort/Medium Success Rate	238
Low effort/High success rate	185

For each region the average development costs (per boe) of fields in the probable and possible categories were calculated. These reflect substantial cost inflation over the last few years. Using these as the mean values the Monte Carlo technique was employed to calculate the development costs of new discoveries. A normal distribution with a SD = 20% of the mean value was employed. For the whole of the UKCS the average development costs on this basis were nearly \$14/boe with quite a wide variation. Investment costs for boe depend on several factors including not only the absolute costs in different operating conditions (such as water depth) but on the size of the fields. Thus in the SNS development costs were found to average nearly \$14 per boe because of the small size of field. In the NNS they averaged \$16/boe. Operating costs over the lifetime of the fields were also calculated, as were the decommissioning costs. Total lifetime field costs (excluding E and A costs) were found to average nearly \$25 per boe for the whole of the UKCS, and averaged over \$21 per boe in the SNS, nearly \$25 per boe in the CNS, and \$29 per boe in the NNS.

For new discoveries annual operating costs were modelled as a percentage of accumulated development costs. This percentage varied according to field size. It was taken to increase as the size of the field was reduced reflecting the presence of economies of scale in the exploitation costs. Thus the field lifetime costs in small fields could become very high on a per boe basis.

With respect to fields in the category of technical reserves it was recognised that many have remained undeveloped for a long time, so the mean development costs in each of the basins was set at \$5/boe higher than the mean for the new discoveries in that basin. Thus for the CNS the mean development costs are \$17/boe and in NNS \$21/boe. For purposes of Monte Carlo modelling a normal distribution of the recoverable reserves for each field with a SD = 50% of the mean was assumed. With respect to development costs the distribution was assumed to be normal with a SD = 20% of the mean value.

The annual numbers of new field developments were assumed to be constrained by the physical and financial capacity of the industry. This subject is currently very pertinent in the UKCS. The ceilings were assumed to be linked to the oil/gas scenarios with maxima of 20, 17, and 13 respectively under the High, Medium, and Low Price Cases. These constraints do not apply to incremental projects which are additional to new field developments.

A noteworthy feature of the 131 incremental projects in the database validated by operators is the expectation that the great majority will be executed over the next 3 or 4 years. It is virtually certain that in the medium and longer-term many further incremental projects will be

designed and executed. They are just not yet at the serious planning stage. Such projects can be expected not only linked to currently sanctioned fields, but also to those presently classified as in the categories of probable, possible, technical reserves, and future discoveries.

Accordingly, estimates were made of the potential extra incremental projects from all these sources. Examination of the numbers of such projects and their key characteristics (reserves and costs) being examined by operators over the past 5 years indicated a decline rate in the volumes. On the basis of this, and from a base of the information of the key characteristics of the projects in the database, it was felt that, with a decline rate reflecting historic experience, further portfolios of incremental projects could reasonably be expected. As noted above such future projects would be spread over all categories of host fields. Their sizes and costs reflect recent trends.

The effects of the introduction of the field allowance were modelled within the above modelling framework. The impact of the allowance for small fields was given particular attention as it affects many fields.

### **3. Results**

#### **A. Key Effects under Pre-Budget Terms**

To put the effects of the budget proposals in perspective summary results of the position under the pre-budget terms are shown first in Charts 1 – 9<sup>1</sup> and Table 6.

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<sup>1</sup> Full results of the pre-budget situation are shown in “The Prospects for Activity in the UKCS to 2035: the 2008 Perspective”, North Sea Occasional Study Paper No. 109, by A.G. Kemp and Linda Stephen, University of Aberdeen Department of Economics, October 2008, pp. 61.

Chart 1

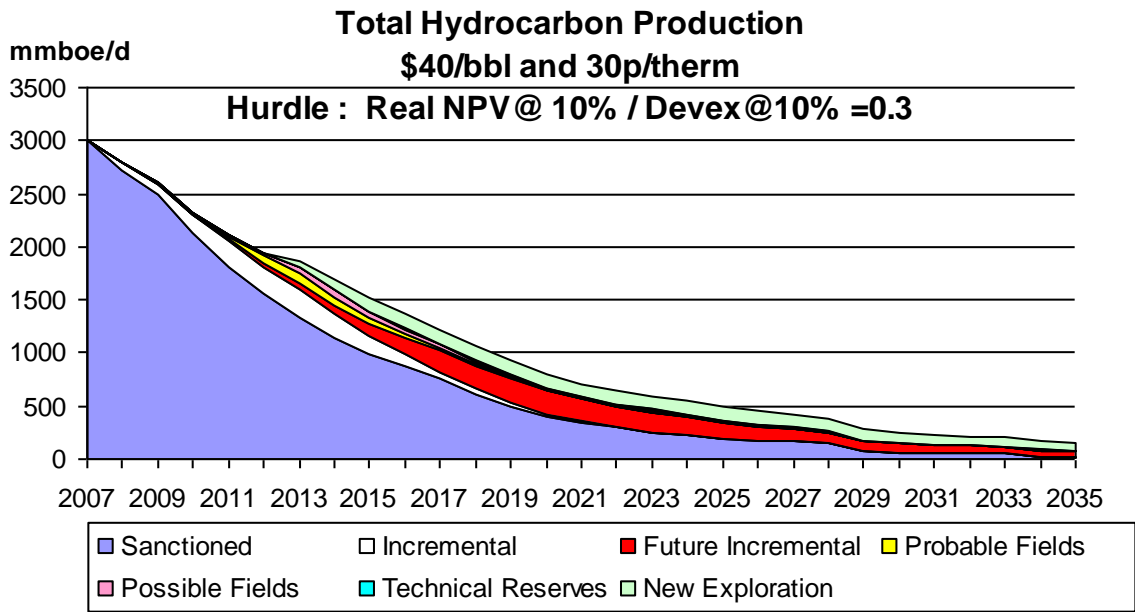


Chart 2

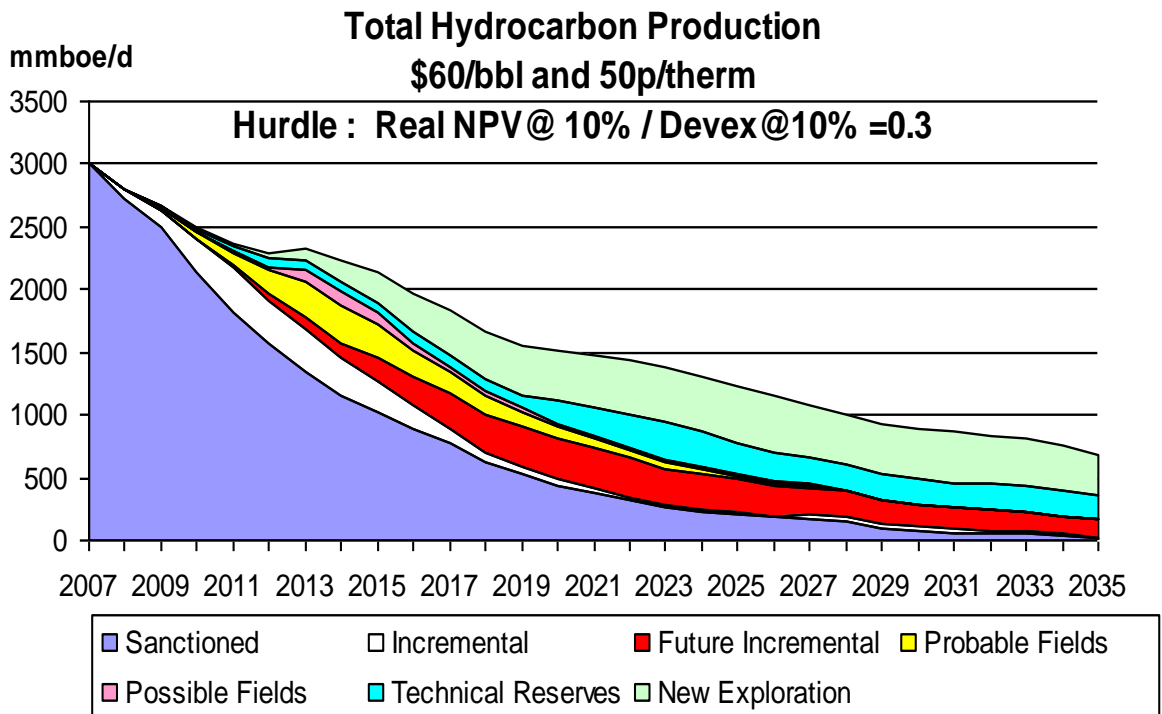


Chart 3

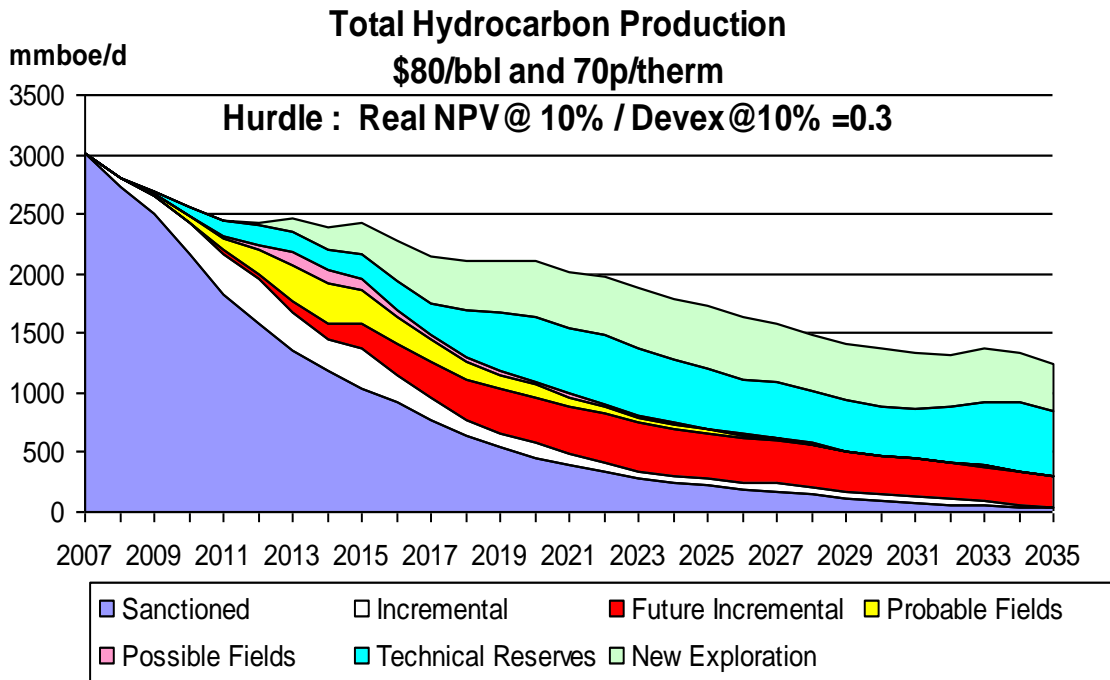


Chart 4

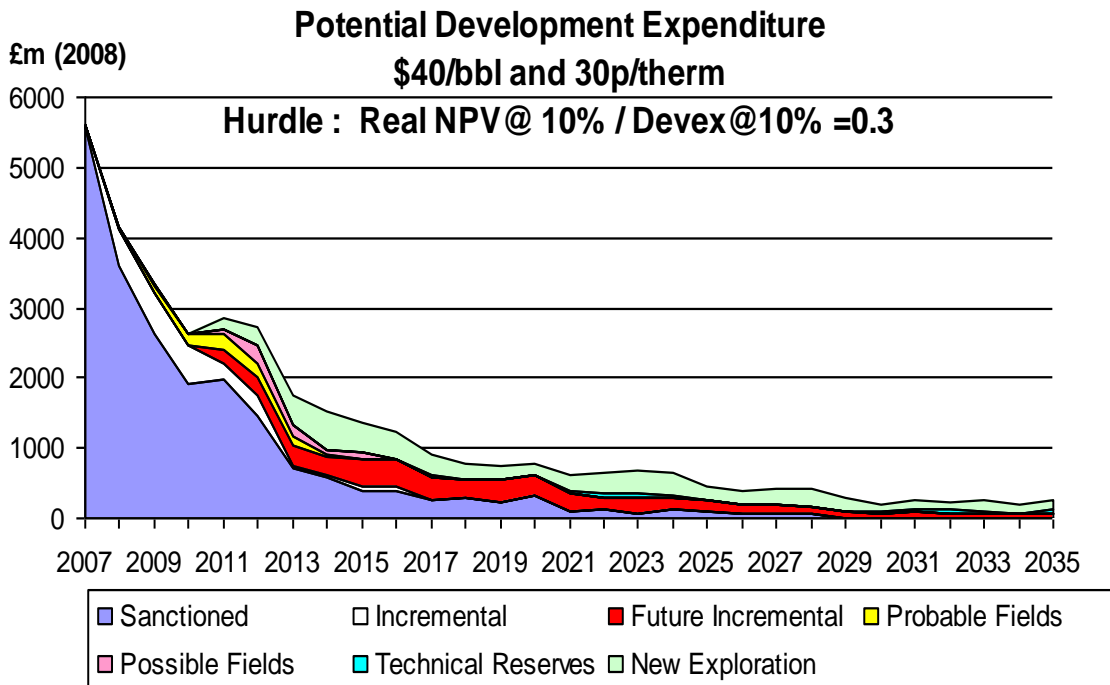




Chart 5

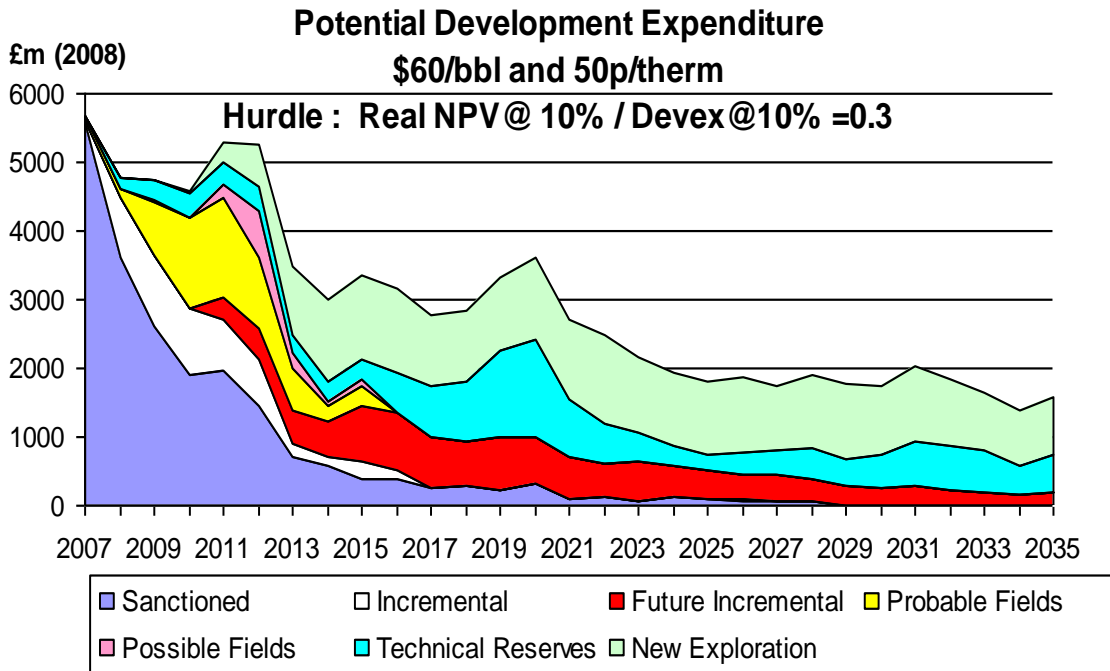


Chart 6

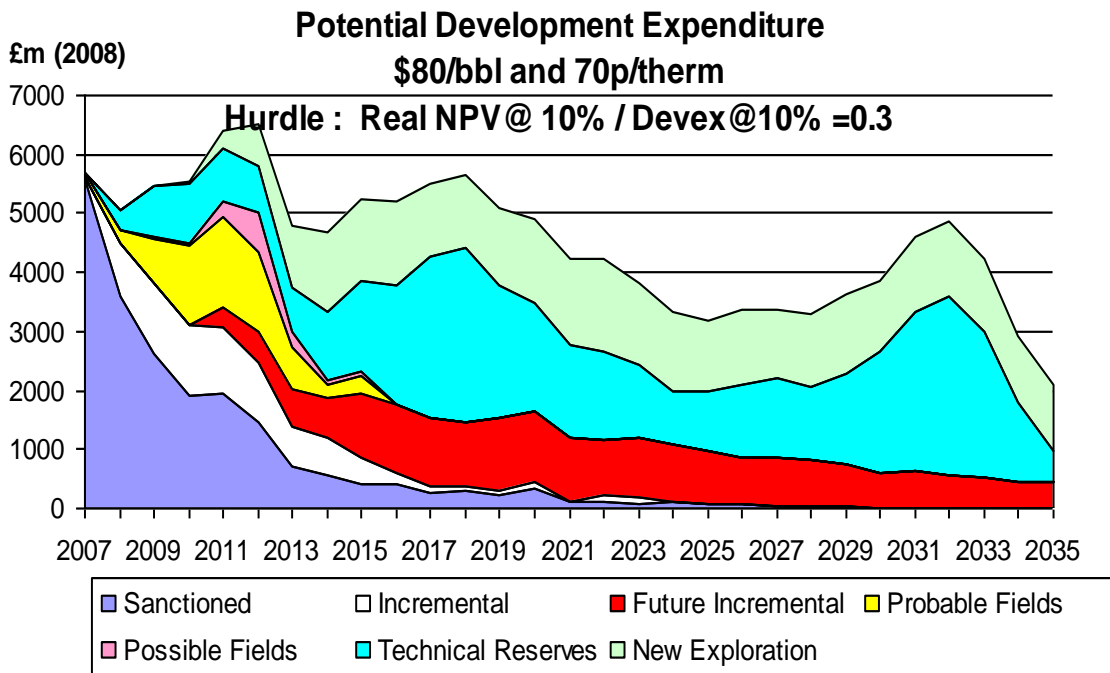


Chart 7

**Potential Operating Expenditure**  
**\$40/bbl and 30p/therm**  
**Hurdle: Real NPV @ 10%/Devex @ 10% = 0.3**

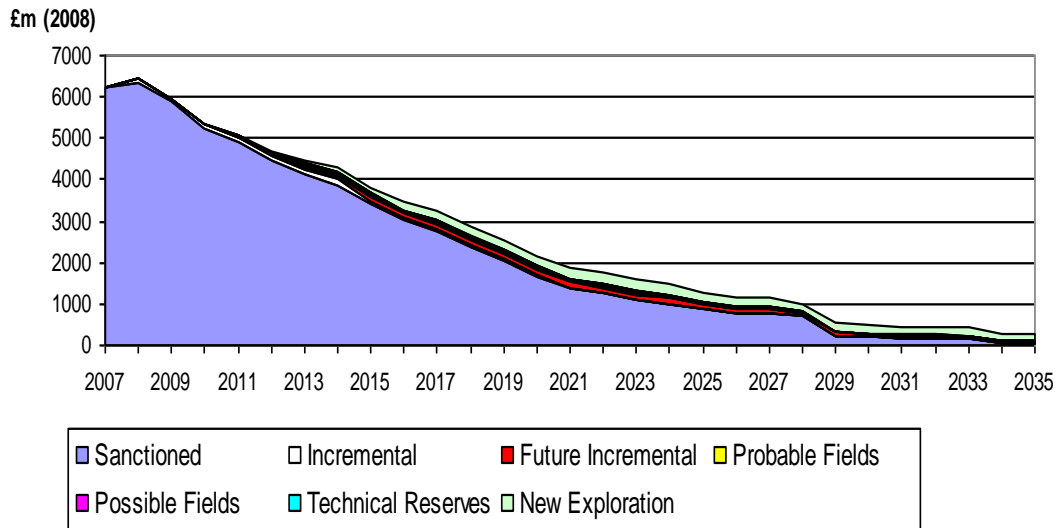


Chart 8

**Potential Operating Expenditure**  
**\$60/bbl and 50p/therm**  
**Hurdle: Real NPV @ 10%/Devex @ 10% = 0.3**

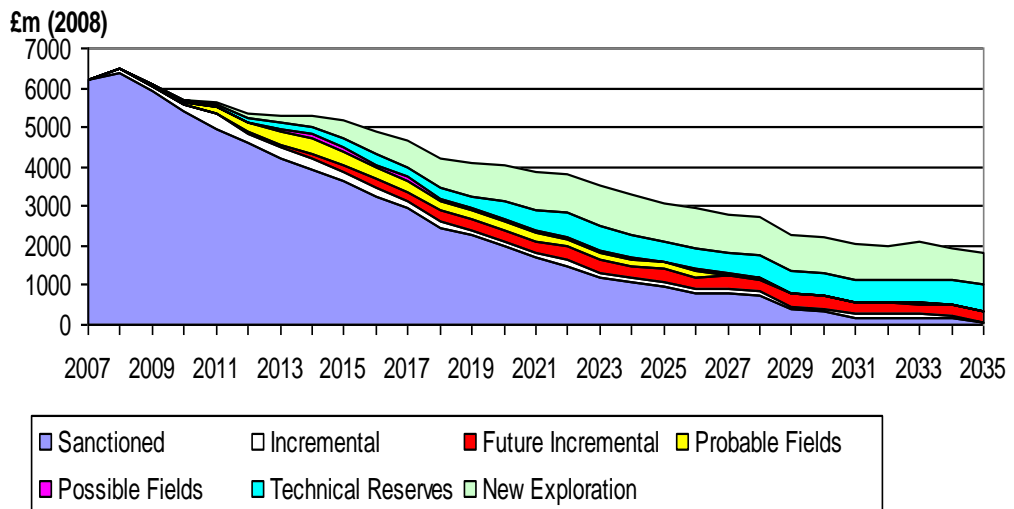


Chart 9

**Potential Operating Expenditure**  
**\$80/bbl and 70p/therm**  
**Hurdle: Real NPV @ 10%/Devex @ 10% = 0.3**

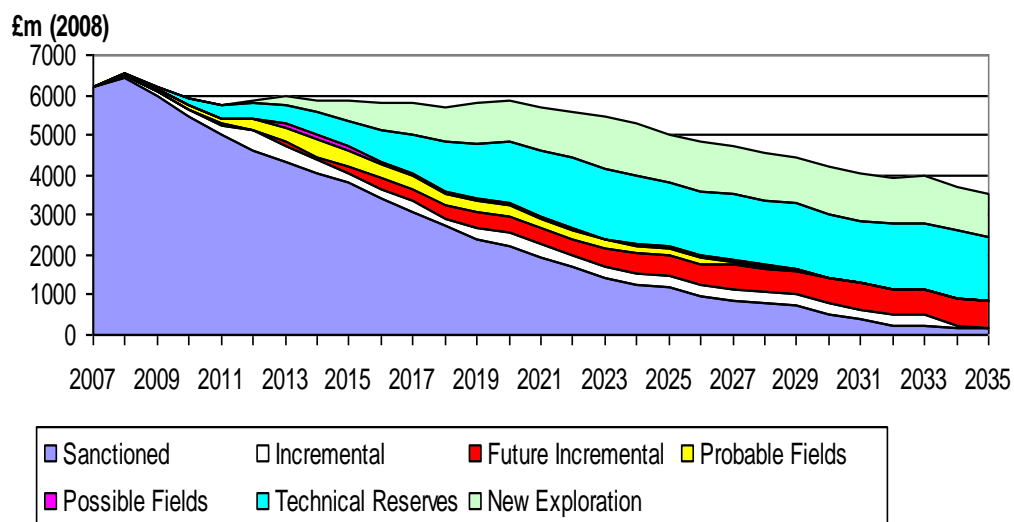


Table 6

**Cumulative Potential Production from 2008 to 2035 (Mmboe)**

**Hurdle: Real NPV @ 10% / real**

**Devex @ 10% = 0.3**

**Standard Case**

	Sanctioned	Current Incremental	Future Incremental	Probable Fields	Possible Fields	Technical Reserves	New Exploration	TOTAL
\$40/bbl and 30p/therm	<b>7106</b>	<b>664</b>	<b>1107</b>	<b>187</b>	<b>174</b>	<b>44</b>	<b>931</b>	<b>10212</b>
\$60/bbl and 50p/therm	<b>7244</b>	<b>1044</b>	<b>1898</b>	<b>838</b>	<b>240</b>	<b>1581</b>	<b>3102</b>	<b>15947</b>
\$80/bbl and 70p/therm	<b>7352</b>	<b>1344</b>	<b>2680</b>	<b>901</b>	<b>249</b>	<b>3804</b>	<b>3553</b>	<b>19884</b>

## B. Effects of Allowance for Small Fields

The effects of the field allowance for small fields are shown under different headings as follows:

### (a) Numbers of New Field Development Triggered to 2035

The numbers of new field developments triggered by the allowance under the 3 price scenarios are shown in Charts 10 -12 and in Tables 7 – 9 which also show the numbers passing and failing the economic hurdle under the pre-budget terms.

Chart 10

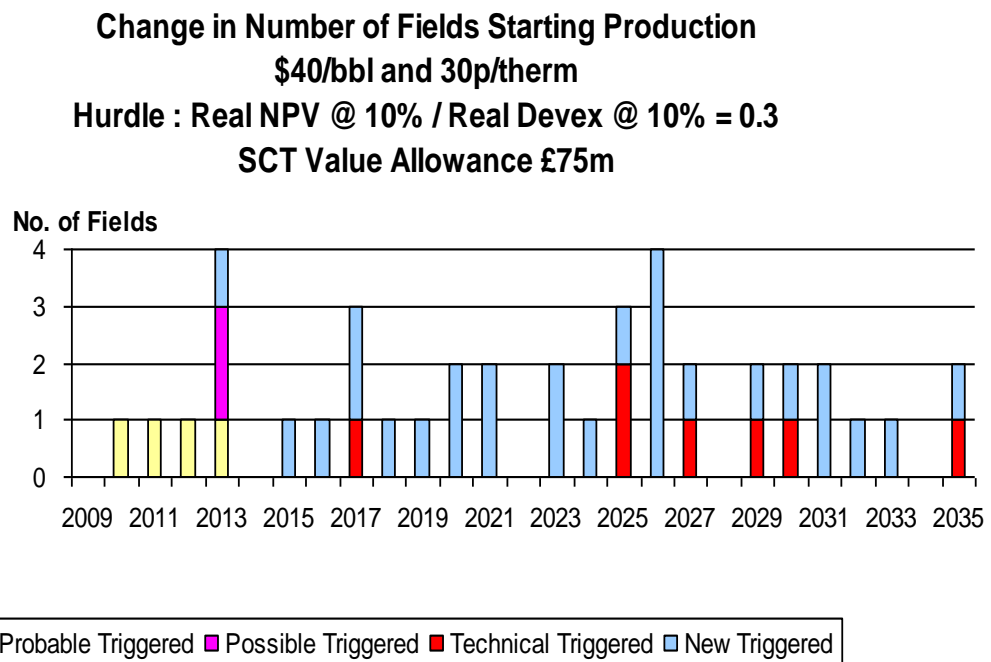


Chart 11

**Change in Number of Fields Starting Production**  
**\$60/bbl and 50p/therm**  
**Hurdle : Real NPV @ 10% / Real Devex @ 10% = 0.3**  
**SCT Value Allowance £75m**

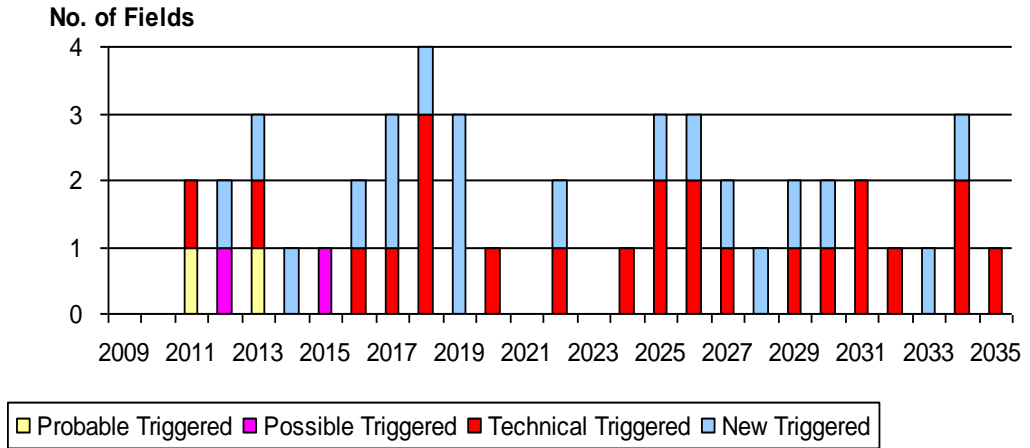


Chart 12

**Change in Number of Fields Starting Production**  
**\$80/bbl and 70p/therm**  
**Hurdle : Real NPV @ 10% / Real Devex @ 10% = 0.3**  
**SCT Value Allowance £75m**

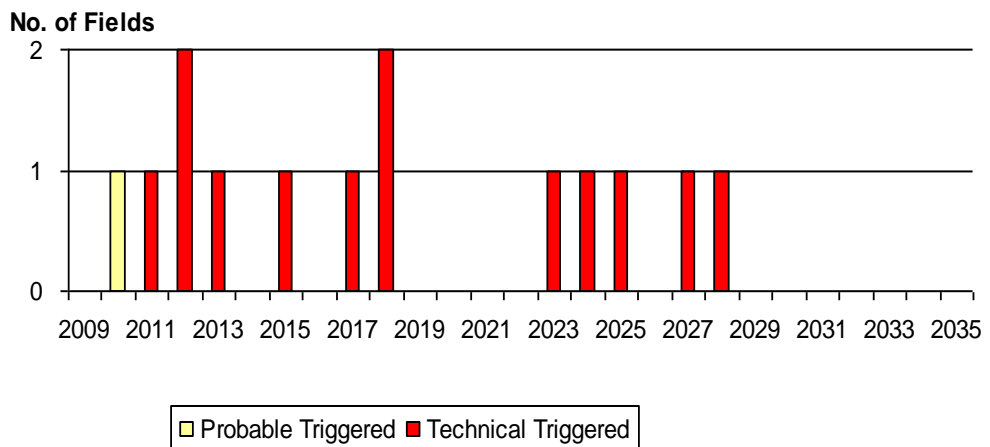


Table 7

**Potential New Field Development in UKCS 2009-2035**

<b>\$40, 30 pence case</b>			
	Pass Pre-Budget 2009	Fail Pre-Budget 2009	Triggered by £75m. value allowance
Probable	5	31	4
Possible	5	10	2
Technical Reserves	5	148	8
New Discoveries	48	137	27
<b>TOTAL</b>	<b>63</b>	<b>326</b>	<b>41</b>

Table 8

**Potential New Field Development in UKCS 2009-2035**

<b>\$60, 50 pence case</b>			
	Pass Pre-Budget 2009	Fail Pre-Budget 2009	Triggered by £75m. value allowance
Probable	28	8	2
Possible	11	4	2
Technical Reserves	103	111	24
New Discoveries	207	31	21
<b>TOTAL</b>	<b>349</b>	<b>154</b>	<b>49</b>

Table 9

**Potential New Field Development in UKCS 2009-2035**

<b>\$80, 70 pence case</b>			
	Pass Pre-Budget 2009	Fail Pre-Budget 2009	Triggered by £75m. value allowance
Probable	33	3	1
Possible	14	1	0
Technical Reserves	103	23	13
New Discoveries	207	1	0
<b>TOTAL</b>	<b>357</b>	<b>28</b>	<b>14</b>

There are 41 developments triggered under the \$40, 30 pence scenario, 49 under the \$60, 50 pence case, and 14 under the \$80, 70 pence case. The lower number under the high price case reflects the fact that the great majority of fields already pass the hurdle under the pre-budget tax terms. Under the low price case a few fields in the probable and possible categories are triggered as are more new discoveries. Very few of fields in the category of technical reserves are triggered reflecting their relatively high development costs. Under the \$60, 50 pence case significant numbers of new discoveries become viable as do a worthwhile number of those in the category of technical reserves. Under the \$80, 70 pence case many more of the high cost fields in the category of technical reserves become viable under the pre-budget terms and a worthwhile more pass the hurdle after the tax relief.

(b)Extra Production Triggered to 2035

The extra oil production triggered by the field allowance for small fields is shown in Charts 13 – 15. Under the \$40, 30 pence case the extra oil production is very small in the period up to 2021 when it reaches 34,000 b/d and grows to 50,000 b/d in 2027 and 2028 after which it falls to 30,000 b/d in 2035. In the years from 2018 onwards the great majority of the increased production comes from new discoveries. Under the \$60, 50 pence case the extra yearly production never exceeds 24,000 b/d despite the fact that more new developments are triggered in this scenario than under the lower price case. This is explained by the lower average size of the triggered developments under the \$60, 50 pence case. The larger fields often pass the hurdle under the pre-budget tax terms. It is noticeable that a significant proportion of the extra production comes from fields in the category of technical reserves under the \$60, 50 pence case. Under the \$80, 70 pence case the increase in oil production is very small as most developments are viable under the pre-budget terms.

Chart 13

**Change in Potential Oil Production**  
**\$40/bbl and 30p/therm**  
**Hurdle : Real NPV @ 10% / Real Devex @ 10% = 0.3**  
**SCT Value Allowance £75m**

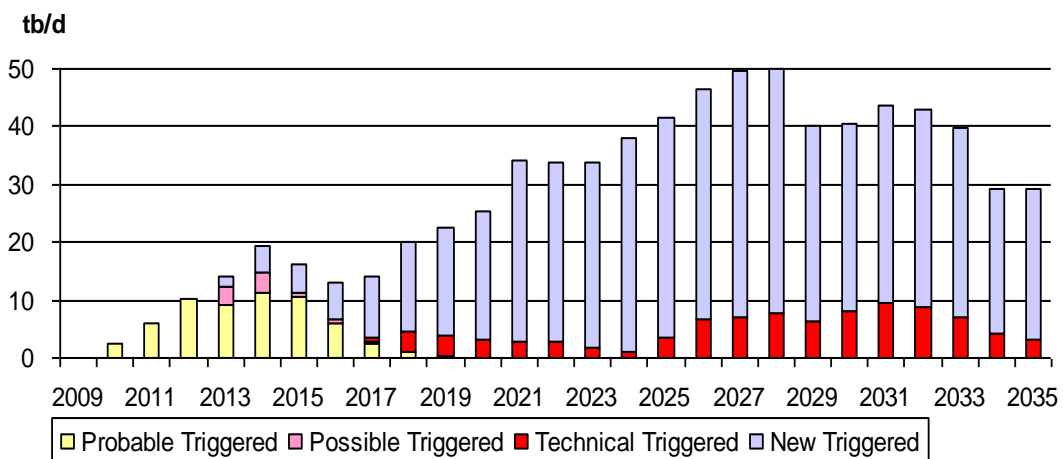




Chart 14

**Change in Potential Oil Production**  
**\$60/bbl and 50p/therm**  
**Hurdle : Real NPV @ 10% / Real Devex @ 10% = 0.3**  
**SCT Value Allowance £75m**

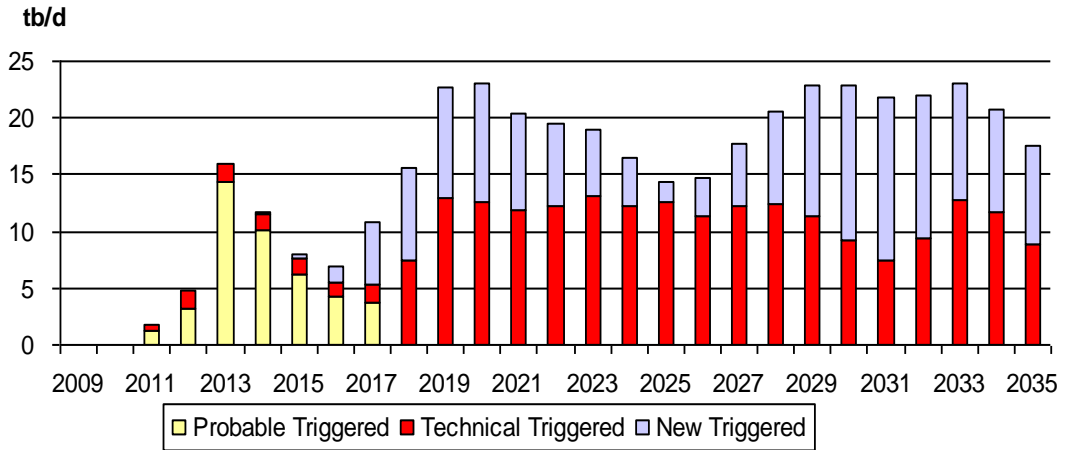
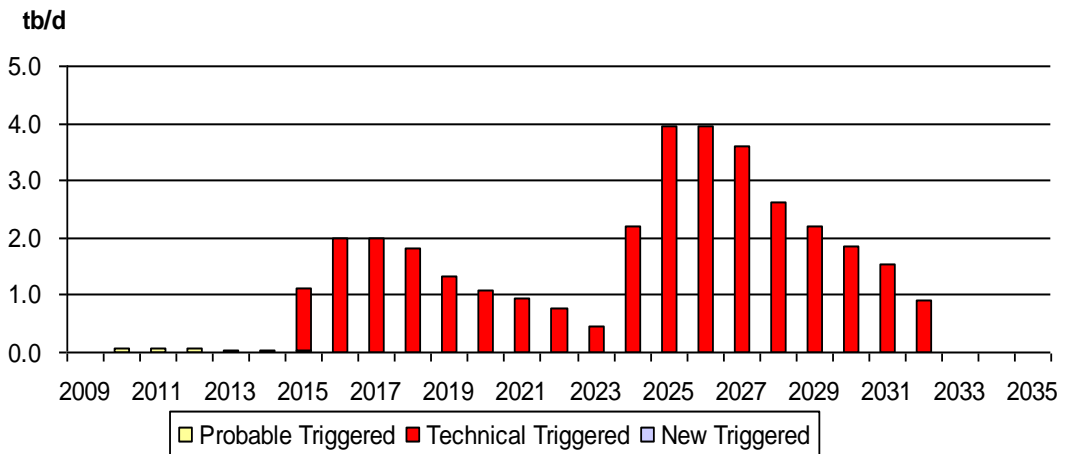


Chart 15

**Change in Potential Oil Production**  
**\$80/bbl and 70p/therm**  
**Hurdle : Real NPV @ 10% / Real Devex @ 10% = 0.3**  
**SCT Value Allowance £75m**



The gas production triggered by the field allowance for small fields is shown in Charts 16 – 18. Under the \$40, 30 pence scenario the triggered yearly production increases gradually to exceed 100, mmcf/d in 2018 and continues to do so until after 2033, reaching peaks of over 140, mmcf/d in some years. Much of the increase comes from fields in the categories of new discoveries. Under the \$60, 50 pence case the triggered production grows to exceed 150 mmcf/d in 2019 and reaches a maximum of 200 mmcf/d in 2021. In this scenario the increase is shared fairly equally between fields in the categories of new discoveries and technical reserves. Under the \$80, 70 pence case the triggered production grows quite rapidly to 100 mmcf/d in 2013 and reaches a peak in 2019 of 140, mmcf/d. Virtually all the triggered production comes from fields in the category of technical reserves.

Chart 16

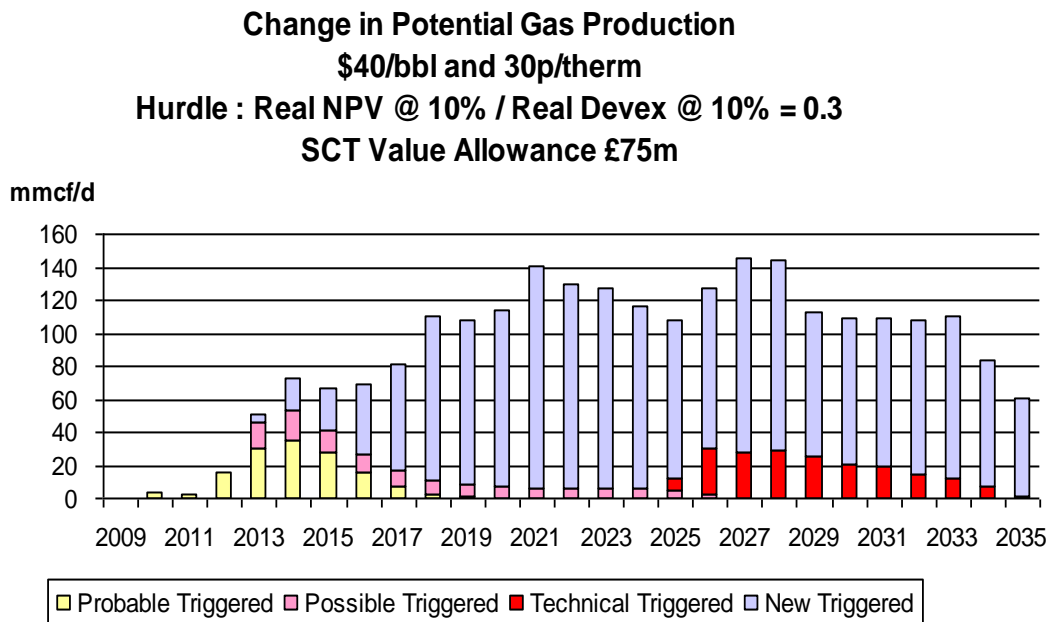


Chart 17

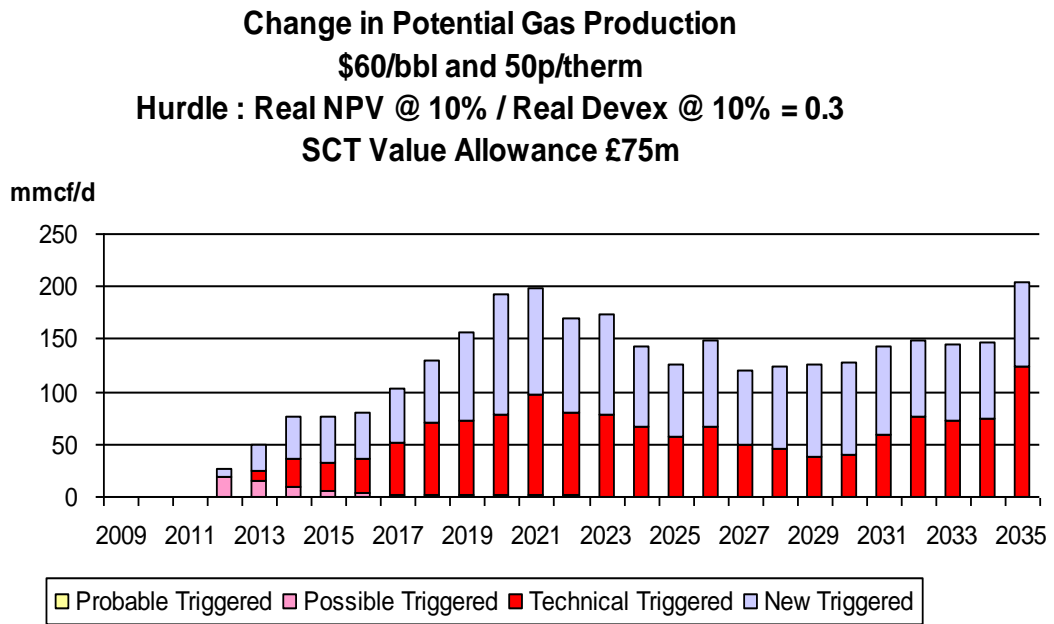
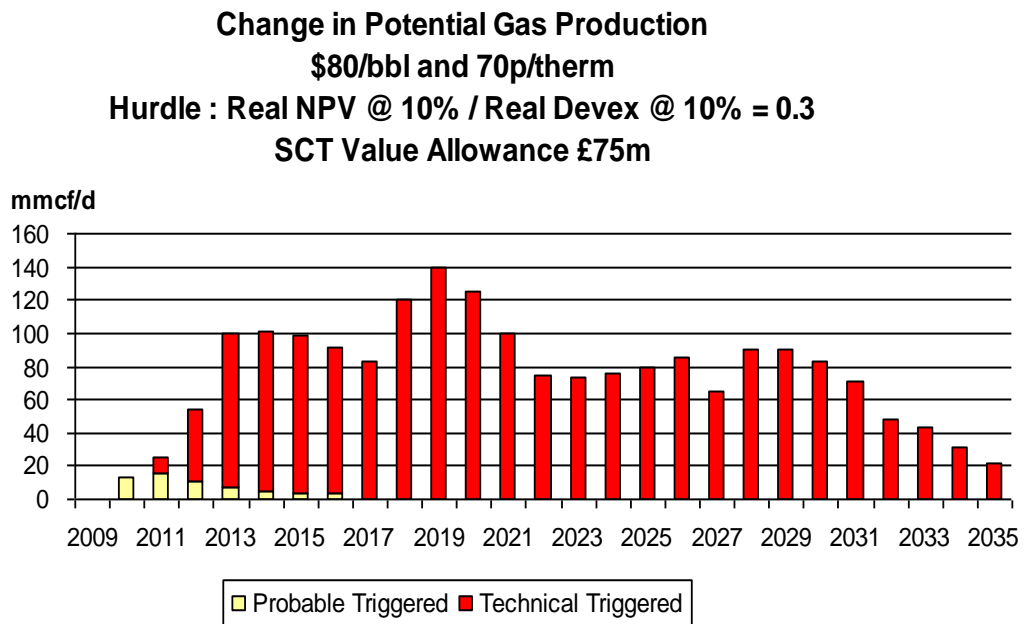


Chart 18



In Charts 19 – 21 the triggered total hydrocarbon production (including NGLs) is shown under the \$40, 30 pence case. The average grows fairly slowly to reach 40,000 boe/d in 2018, 60,000 boe/d in 2021 and a peak of 75,000 boe/d in 2027 and 2028. By 2035 the incremental production falls to 40,000 boe/d. It is noteworthy that most of the extra production emanates from fields in the category of new discoveries. Under the \$60, 50 pence scenario the triggered production increases slowly to 30,000 boe/d in 2018 and reaches a peak of 58,000 boe/d in 2020. At 2035 the increase is still substantial at 54,000 boe/d. The longer term increase is fairly evenly divided between those in the categories of new discoveries and technical reserves. Under the \$80, 70 pence case the triggered production is quite small reaching 17,000 boe/d in 2017 and peaking at 26,000 boe/d in 2020. For many years the increase is in the 15,000 – 20,000 boe/d range. Virtually all the triggered production emanates from fields in the category of technical reserves.

Chart 19

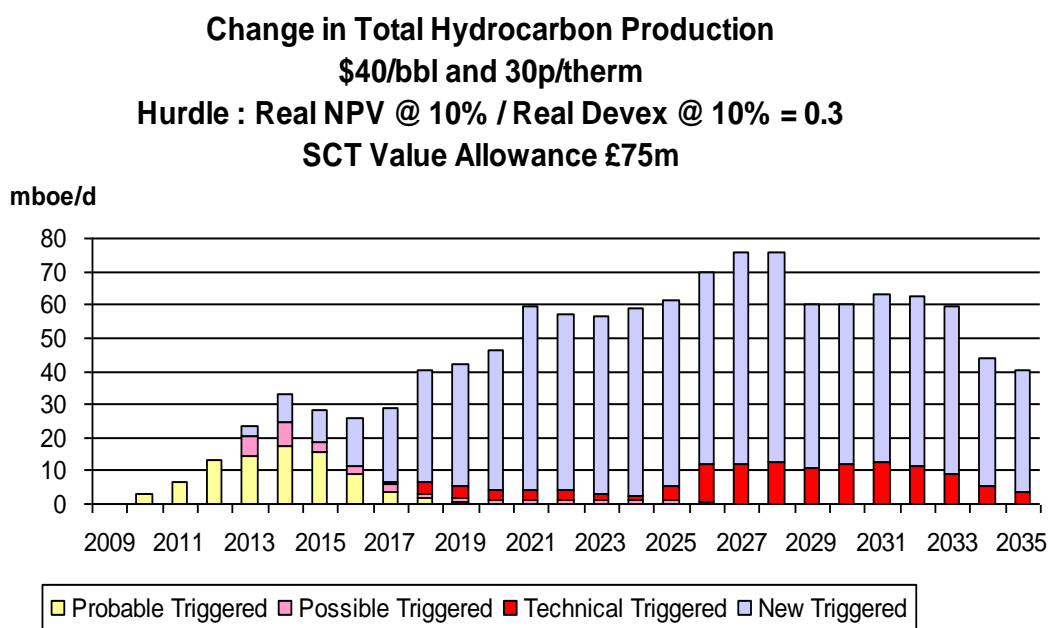


Chart 20

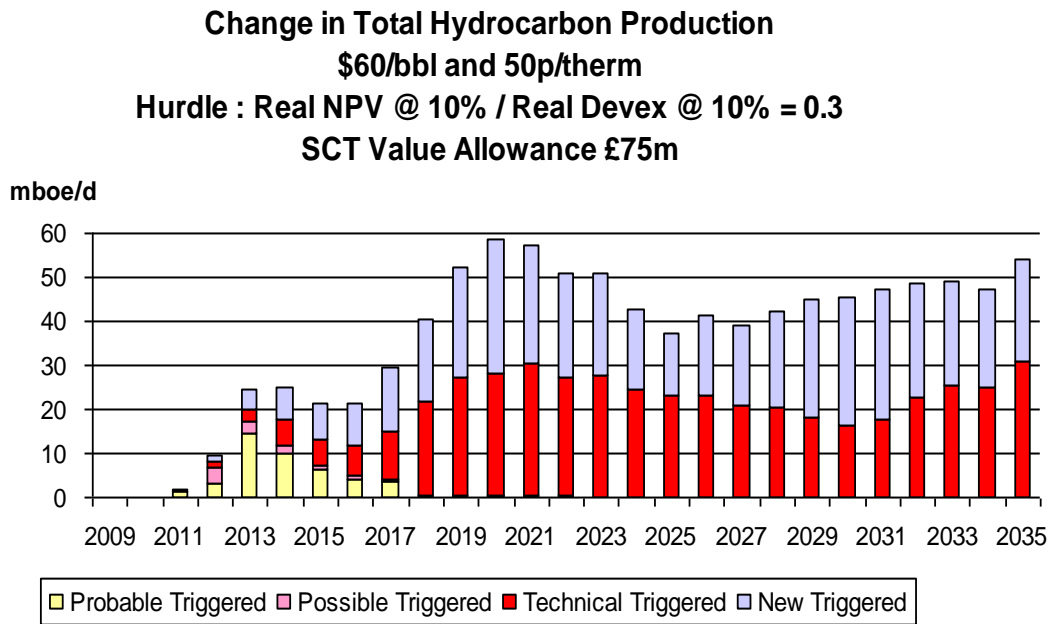
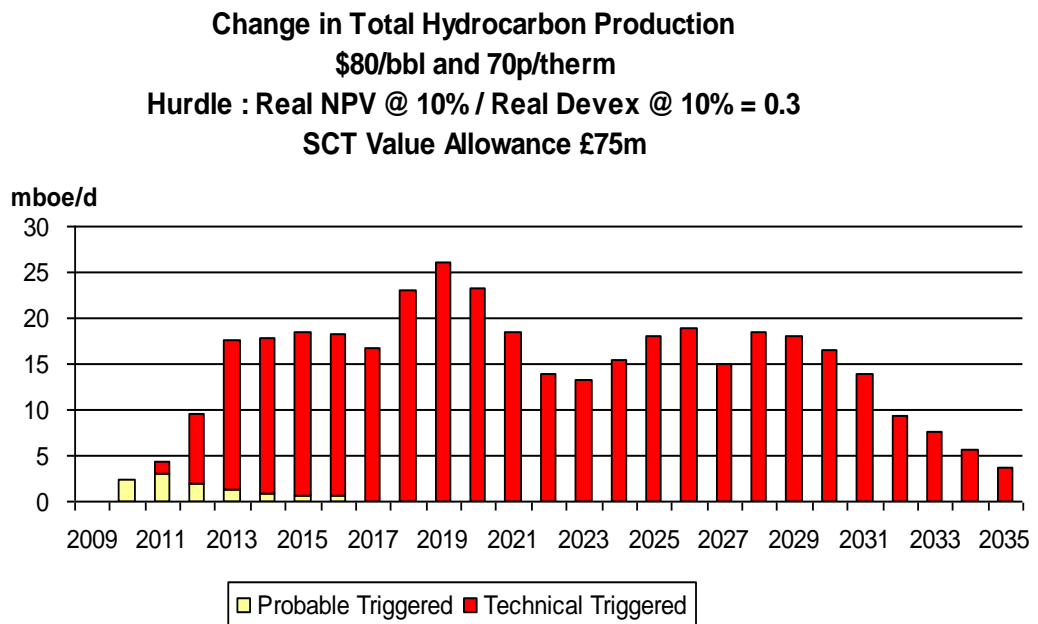


Chart 21



Total cumulative triggered hydrocarbon production in the period to 2035 is shown in Table 10. Under the \$40, 30 pence case the total is 437 mmboe. Nearly 80% emanates from fields in the category of new discoveries, and only around 10% from fields in the probable and possible categories. Under the \$60, 50 pence case the triggered production is nearly 360 mmboe. Of this over 47% comes from each of the field categories of new discoveries and technical reserves. Under the \$80, 70 pence case the extra production is 140 mmboe of which 97% comes from fields in the category of high cost technical reserves.

Table 10

**Cumulative Triggered Production to 2035 (mmboe)**

Fields	<b>\$40, 30 pence</b>	<b>\$60, 50 pence</b>	<b>\$80, 70pence</b>
Probable	30.99	15.85	3.98
Possible	11.29	4.33	0.00
Technical Reserves	45.87	169.38	136.36
New Discoveries	348.74	169.23	0.00
<b>TOTAL</b>	<b>436.88</b>	<b>358.79</b>	<b>140.33</b>

### (c) Extra Field Investment Triggered

The extra field investments triggered to 2035 by the value allowance for small fields under three price scenarios are shown on a yearly basis in Charts 22 – 24. Under the \$40, 30 pence case the average annual amount triggered is nearly £130 million (at 2008 prices). In the near term there is some increase in expenditure on probable and possible developments but the main impact comes in later years when many new discoveries are developed. Under the \$60, 50 pence price case (Chart 23) the average annual increase in field investment is around £170 million (at 2008 prices). The increase compared to the low price case is due not only to the induced development of a larger number of fields but to the higher costs of developing the fields in the technical reserves category. Under the \$80, 70 pence case (Chart 24) the annual average increase in field investment is around £76 million, nearly all on the high cost fields in the technical reserves category. The lower increase in expenditure compared to the \$60, 50 pence scenario results from the smaller number of induced developments at the high price. In turn this reflects the fact that most of the field developments are viable under the pre-budget tax terms.

In Table 11 the cumulative triggered field investment to 2035 is shown. It is seen that under the \$40, 30 pence case the total is nearly £3.5 billion (at 2008 prices), nearly £4.3 billion under the \$60, 50 pence case, and nearly £2 billion under the \$80, 70 pence case.

Chart 22

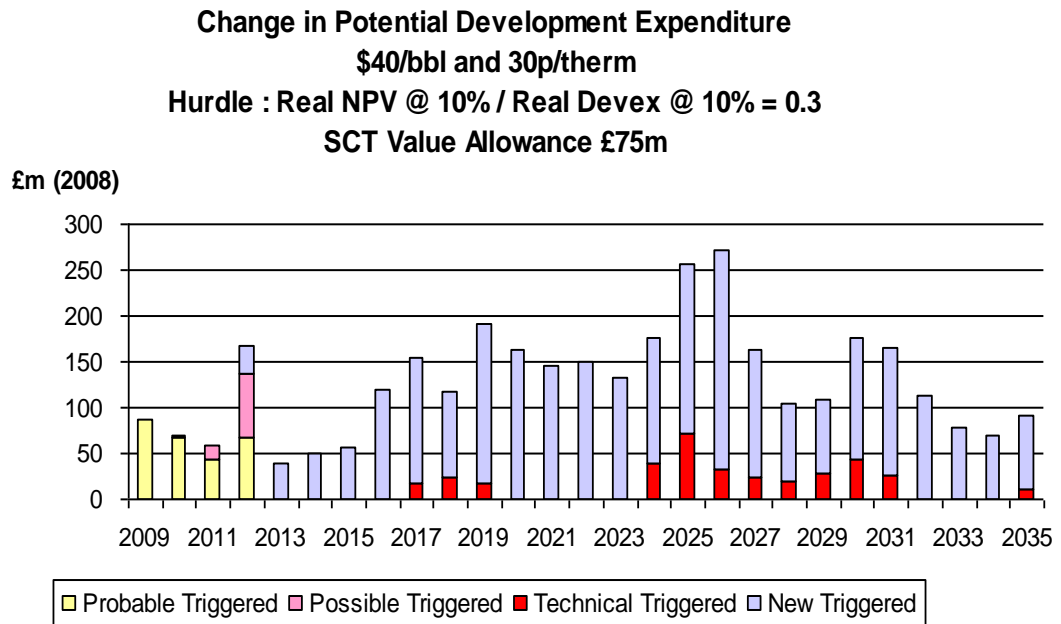


Chart 23

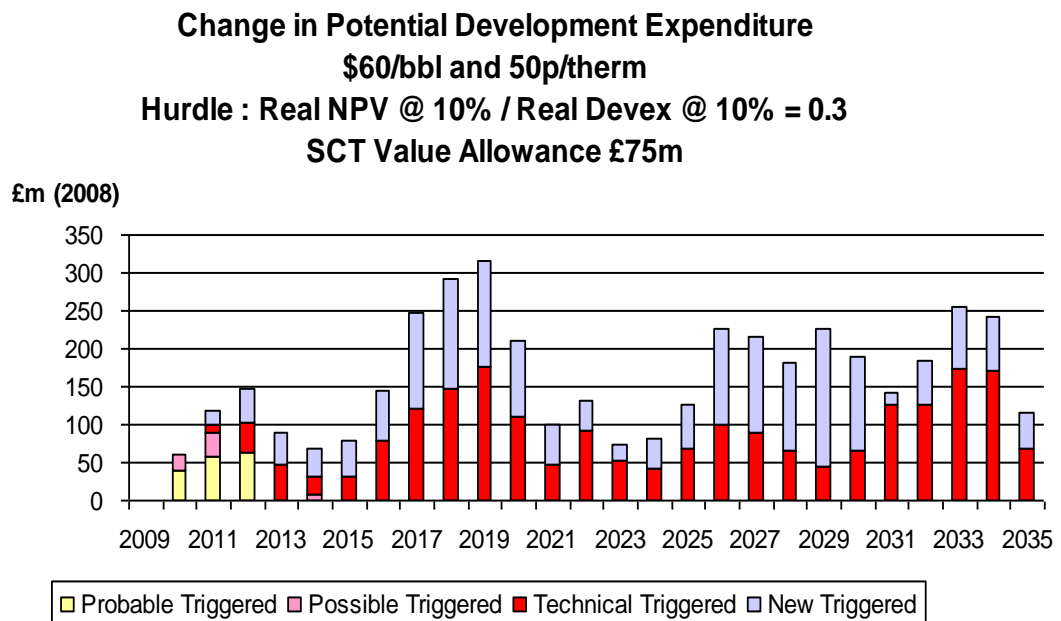




Chart 24

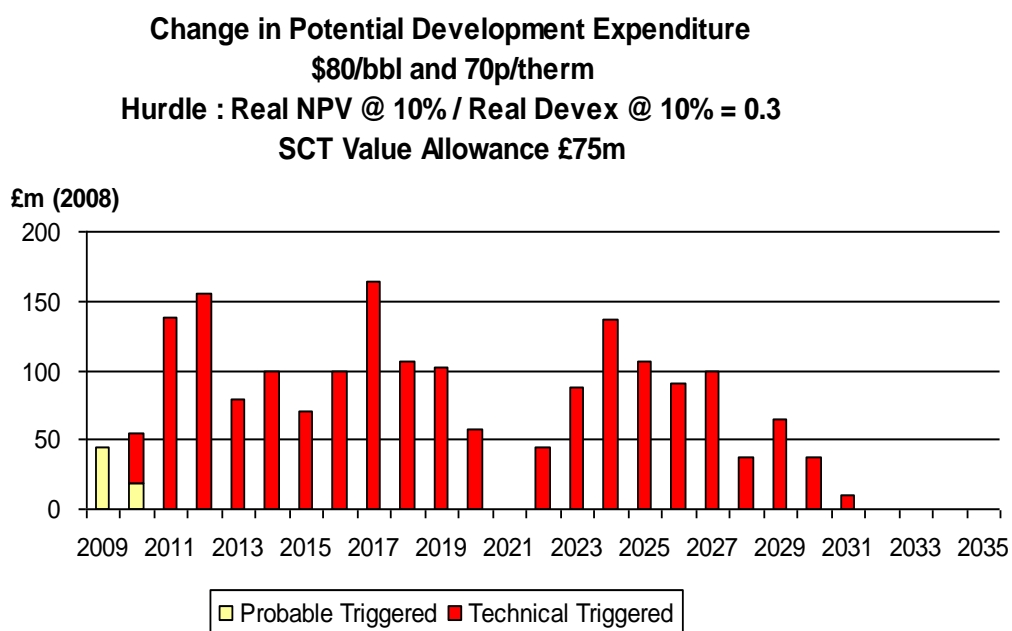


Table 11

**Cumulative Triggered Development Expenditure to 2035**

**£m (2008)**

Fields	<b>\$40, 30 pence</b>	<b>\$60, 50 pence</b>	<b>\$80, 70pence</b>
Probable	264.46	158.89	63.75
Possible	87.88	61.17	0.00
Technical Reserves	355.08	2130.06	1824.82
New Discoveries	2772.11	1911.25	0.00
<b>TOTAL</b>	<b>3479.53</b>	<b>4261.36</b>	<b>1888.57</b>

#### (d) Extra Field Operating Expenditures Triggered

In Charts 25 – 27 the extra operating expenditures triggered by the value allowance for small fields are shown on a yearly basis to 2035. Under the \$40, 30 pence case the annual average is around £114 million (at 2008 prices). It is seen that the annual expenditure rises gradually to reach a peak of over £170 million in the later 2020's. Over the whole period expenditures on new discoveries accounts for the bulk of the extra expenditures. Under the \$60, 50 pence case the average annual increase is £150 million (at 2008 prices). Again the activity rises gradually from low levels reflecting the slow build up of the induced field developments. Peak annual extra expenditure is £200 million (at 2008 prices) attained in 2020. It is seen that the extra expenditure in the longer term is spread fairly equally across fields in the categories of new discoveries and technical reserves. Under the \$80, 70 pence case the average annual induced expenditure is around £80 million (at 2008 prices). It rises gradually to reach a peak of over £130 million in 2019. Virtually all the induced expenditures are on fields in the category of technical reserves.

In Table 12 the cumulative aggregate induced operating expenditures to 2035 are shown. Under the \$40, 30 pence case the total is £2.85 billion (at 2008 prices), £3.75 billion under the \$60, 50 pence case, and £2 billion under the \$80, 70 pence case.

Chart 25

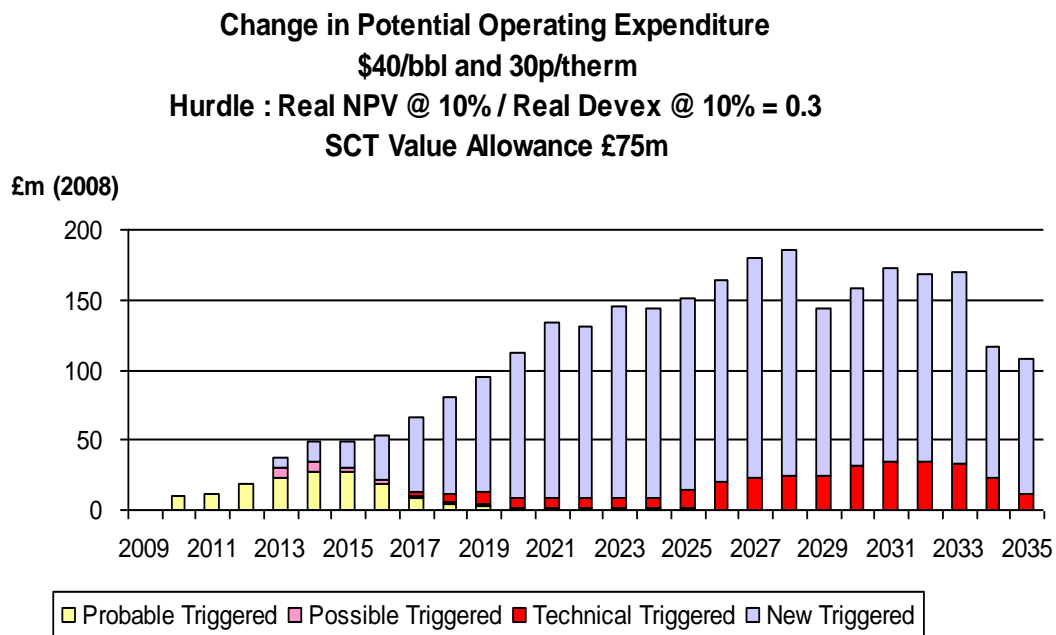


Chart 26

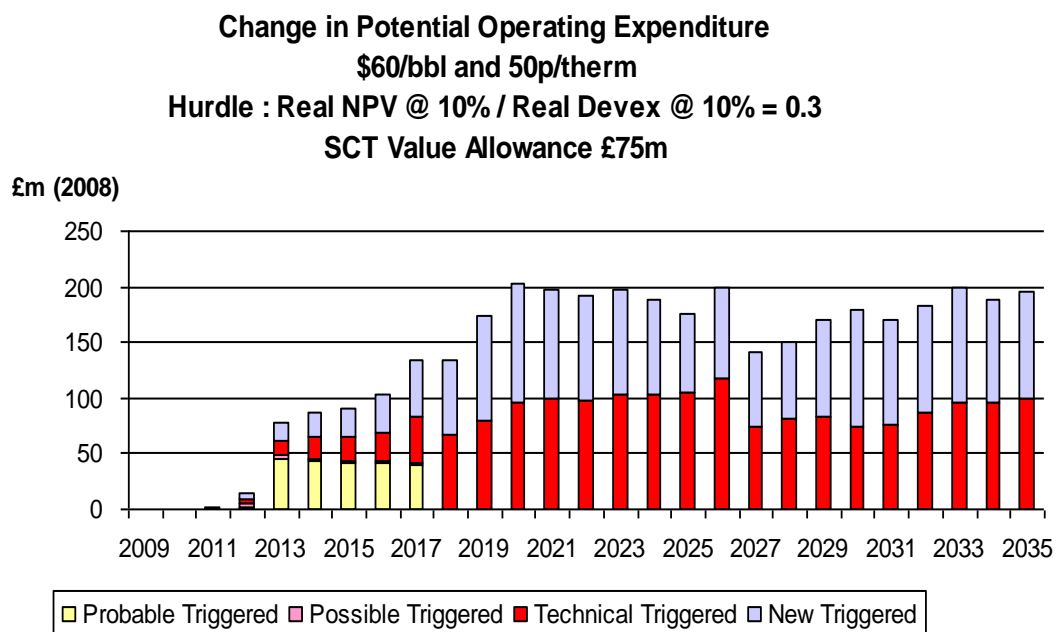


Chart 27

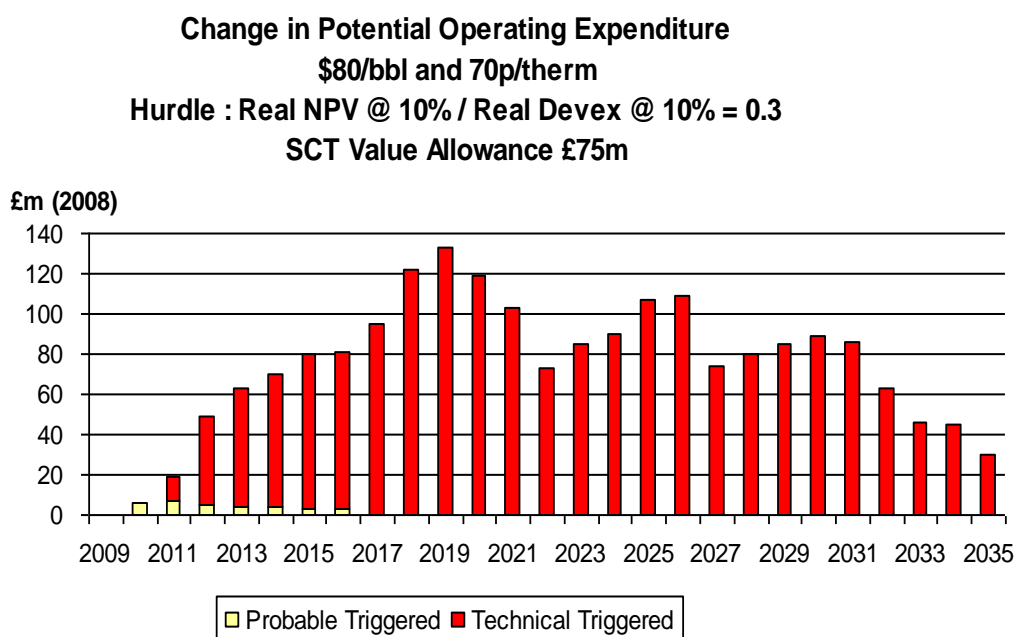


Table 12

**Cumulative Triggered Operating Expenditure to 2035**  
**£m (2008)**

Fields	<b>\$40, 30 pence</b>	<b>\$60, 50 pence</b>	<b>\$80, 70pence</b>
Probable	153.38	216.68	33.62
Possible	32.96	15.48	0.00
Technical Reserves	328.18	1763.12	1970.00
New Discoveries	2337.74	1756.09	0.00
<b>TOTAL</b>	<b>2852.26</b>	<b>3751.37</b>	<b>2003.62</b>

### (e) Changes to Tax Revenues

The budget tax changes have consequences for the aggregate tax revenues received from the UKCS. Thus all new field development and operating expenditures can be relieved for CT and SC at 50% rate with no field ring fence restrictions. The taxable income in eligible fields is reduced by the value allowance. The value allowance being fixed impacts progressively in the sense that it shelters a higher proportion of profits from SC when they are reduced from either lower income or higher costs. Correspondingly, when oil/gas prices increase or costs are reduced a lower proportion of profits is sheltered from SC. For fields whose development is induced the initial impact will be extra tax reliefs for both CT and SC. This is followed by extra receipts of CT and SC when the induced production generates extra profits. But fields which would in any case be developed in the absence of the allowance for SC also benefit from it and pay less SC. This gives rise to a deadweight loss of SC revenues. The net effect is the result of all the above effects.

The multiple effects and the net outcome in terms of the change in total tax revenues (CT + SC) are shown in Chart 28 for the various categories of fields under the \$40, 30 pence case. It is seen in the solid line that there is a small net loss of total tax revenues over the period to 2035. The change in total CT revenues is shown in Chart 29 where the net positive effect is clear. In Chart 30 the net impact on SC alone is shown. Under this low price scenario where profits are relatively low the net effect is clearly negative.

Chart 28

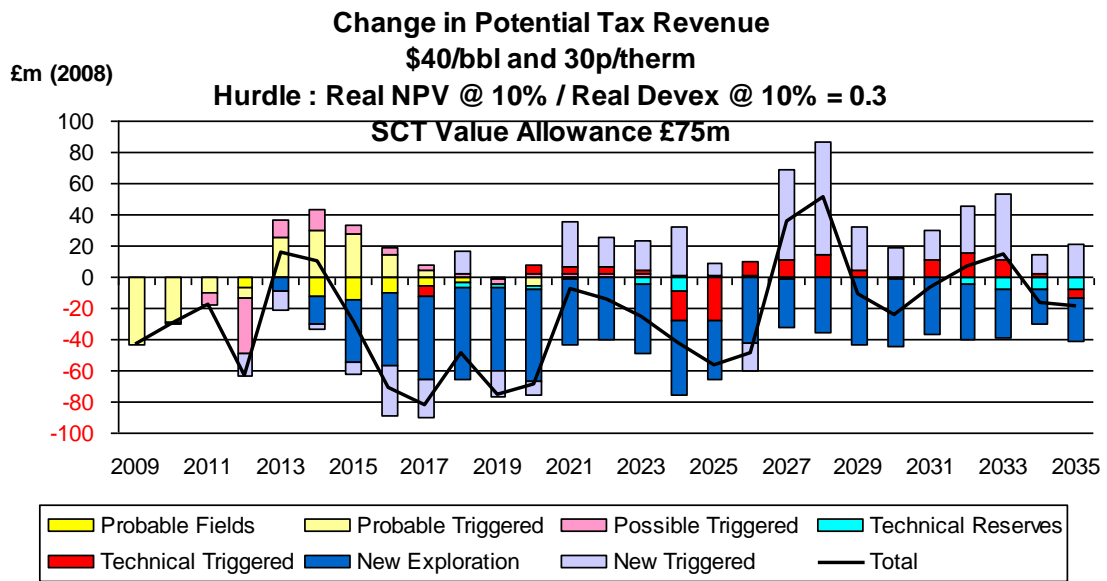


Chart 29

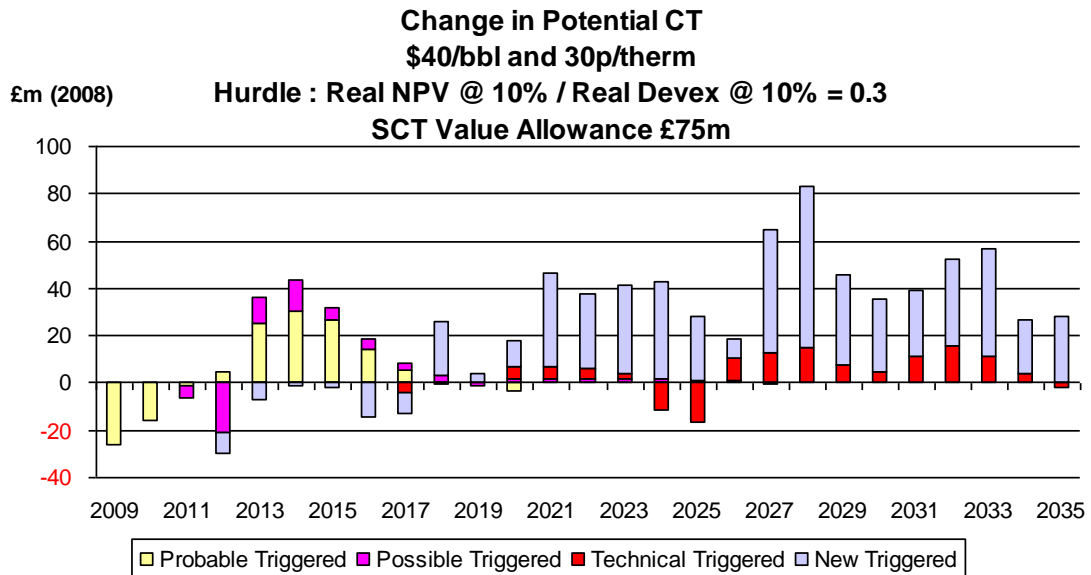
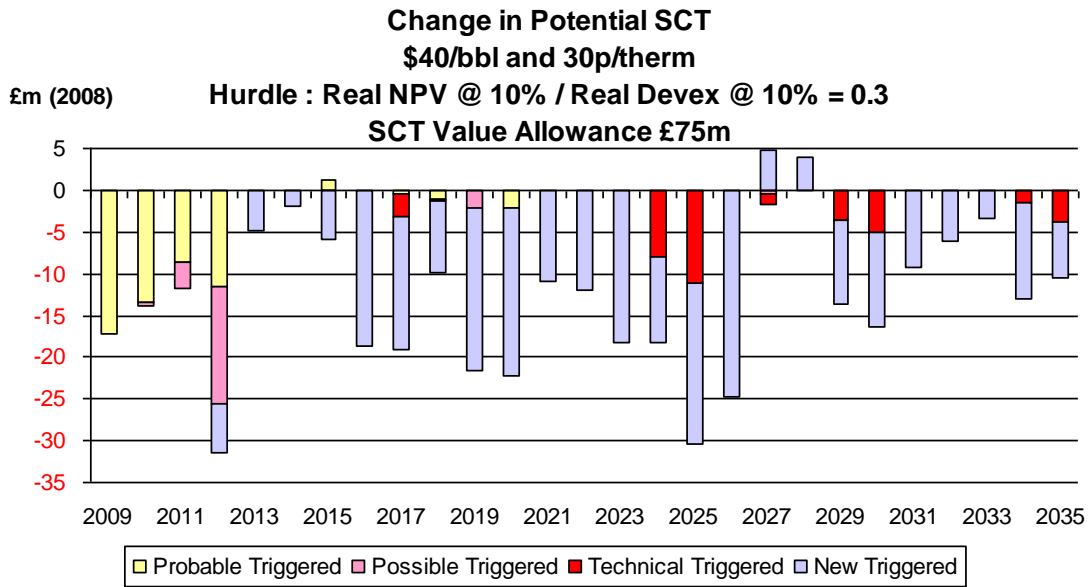


Chart 30



In Chart 31 the various effects on total tax revenues are shown under the \$60, 50 pence case. The net impact on total tax payments is clearly negative. In Chart 32 the effects on CT alone are shown. It is seen that there are substantial net extra payments of CT. In Chart 33 the effects on SC alone are shown. The net impact is significantly negative.

Chart 31

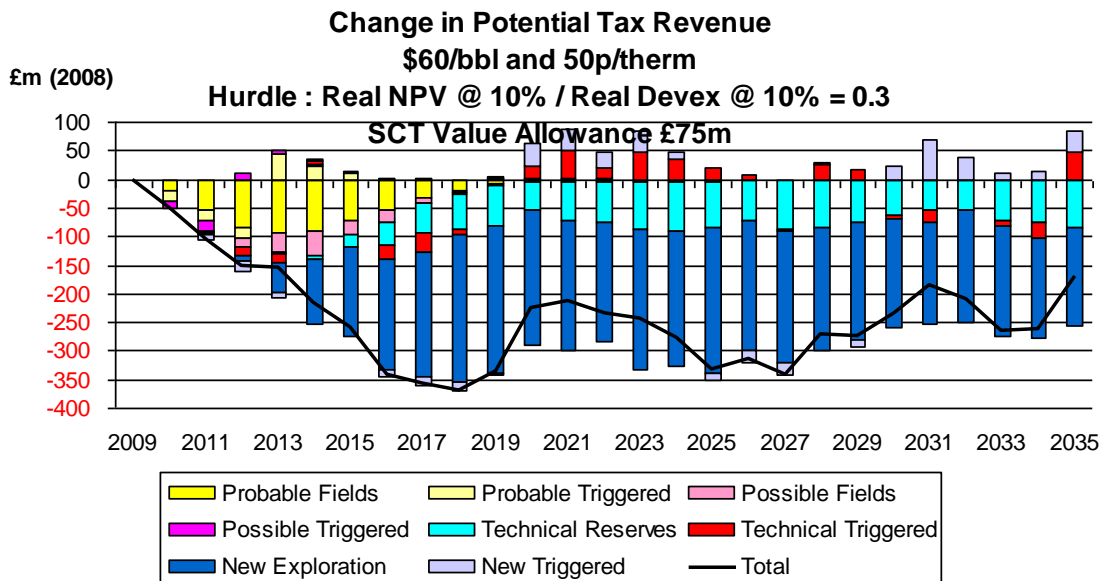


Chart 32

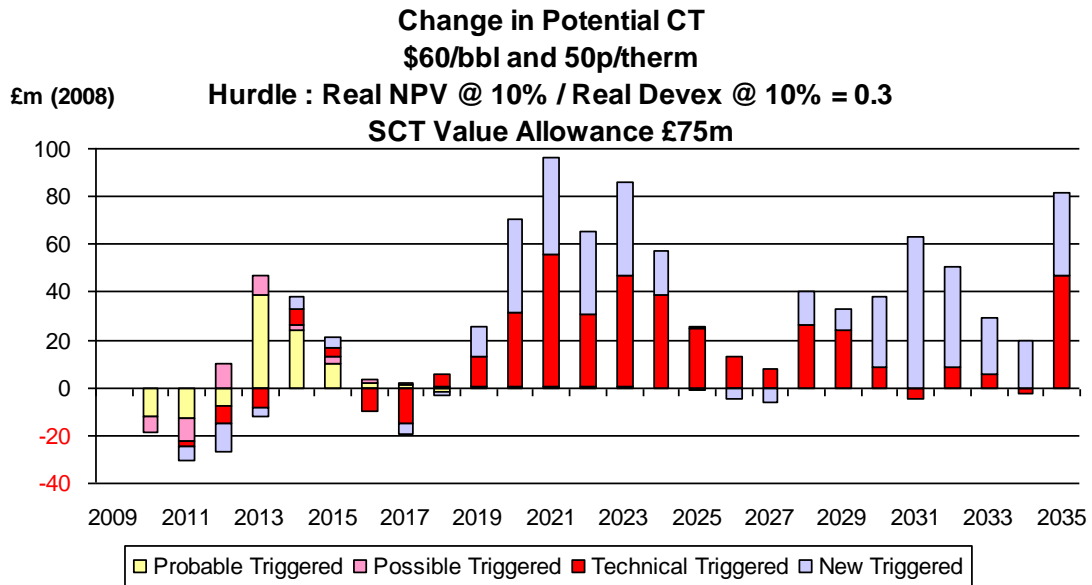
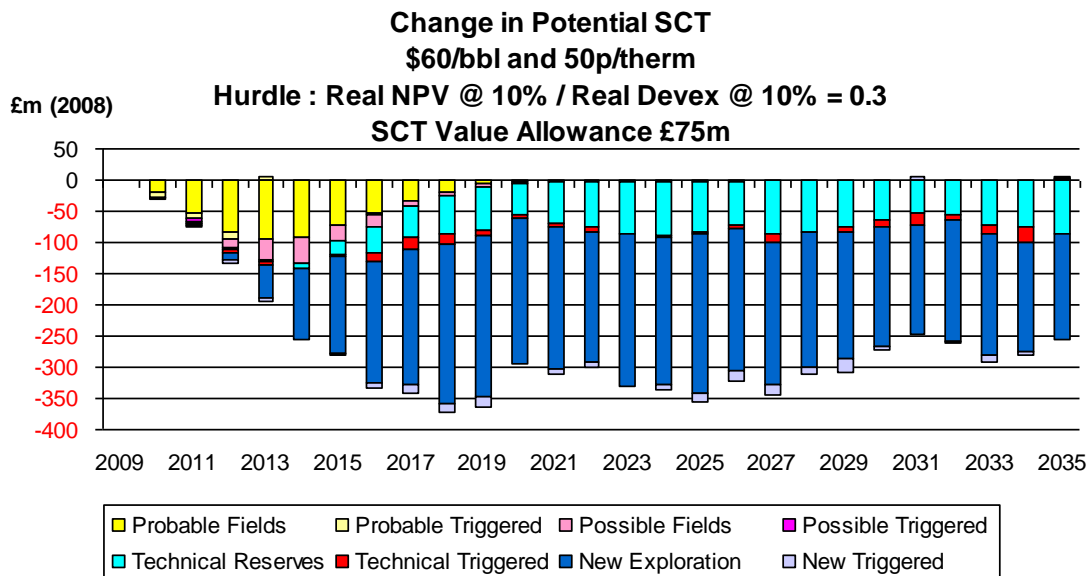


Chart 33





In Chart 34 the various effects of on total tax revenues are shown under the \$80, 70 pence case. There is a substantial net loss of overall tax revenues. This results from the fact that many new fields were viable under the pre-budget tax terms. In Chart 35 the effects on CT alone are shown. The net effect is seen to be positive. In Chart 36 the effect on SC revenues alone is seen to be substantially negative reflecting the fact that the triggered fields were mostly viable on pre-budget tax terms under this price scenario.

It should be emphasised that the induced extra activity all emanates from fields which are economically viable and remain subject to CT.

Chart 34

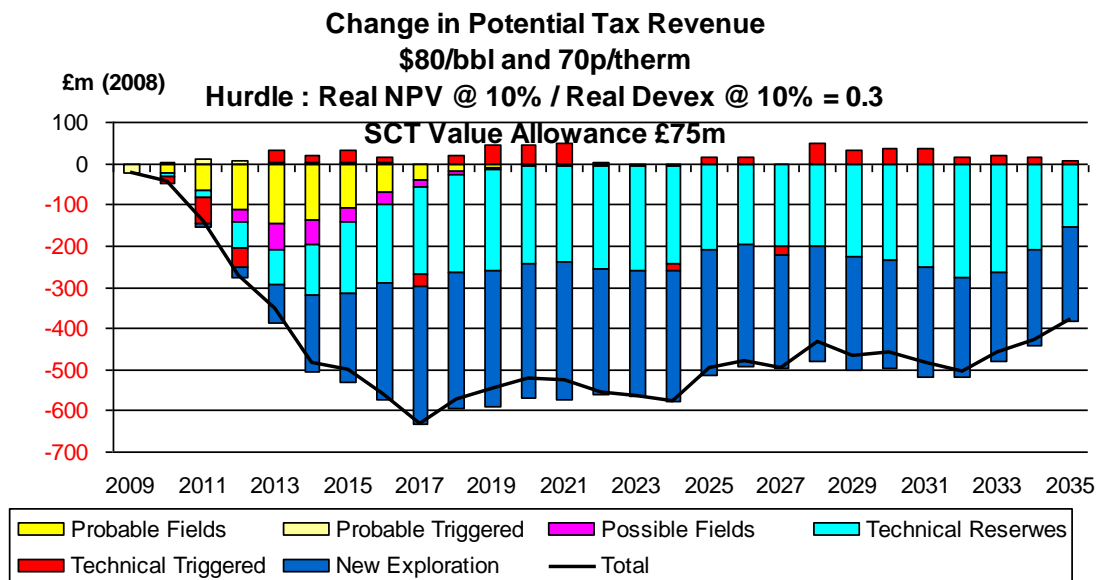


Chart 35

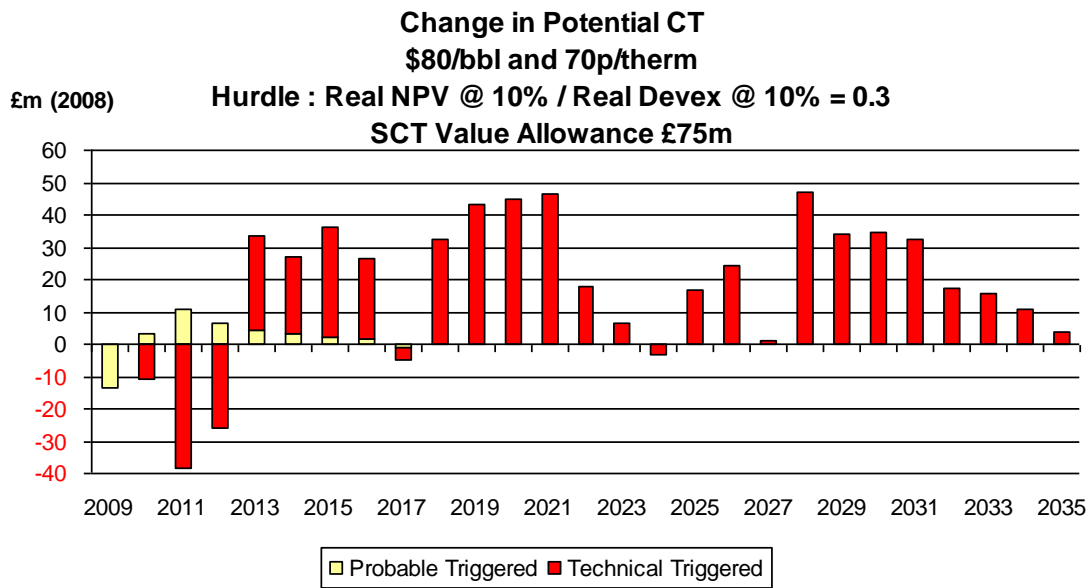
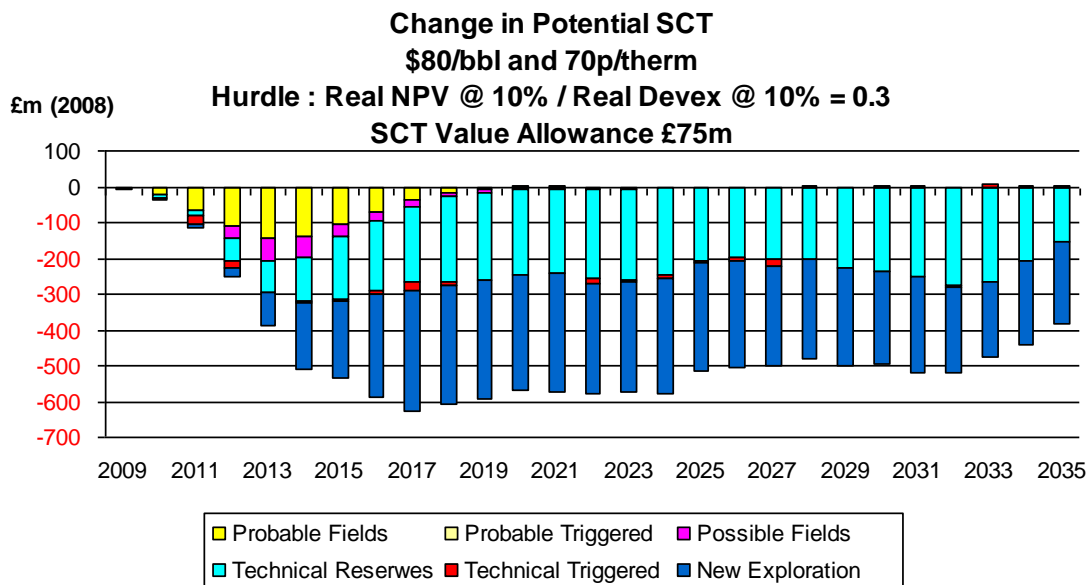


Chart 36



#### (f) Tax Takes after Allowance for Small Fields

The tax takes on fields qualifying for the benefits from the new allowance can be measured in various ways. The allowance itself relates to qualifying fields but the existing allowances for field investment and operating costs may be utilised on a cross-field basis within the UKCS. In this section one possible measure of the tax take on fields receiving benefits from the allowance for small fields has been employed. (It is acknowledged that others can reasonably be employed). It is assumed that on qualifying fields the capital allowances relating to pre-production investment will be utilised against income from other fields, but those relating to post-production investment and operating costs are relieved against the income from the field in question. The tax takes calculated on the above basis can also be shown in various ways, and, to emphasise the structural aspects, they are shown here in real terms, that is after taking account of inflation, but before further discounting for the cost of capital. The take is thus defined as the real tax payments as a percentage of the real pre-tax cash flows from the field. In Chart 37 the position is shown for all future fields, including those receiving no benefits from the small fields allowance as well as qualifying ones, under the \$40, 30 pence case. For those receiving no benefits the take remains at 50%. For those fields to which the allowance applies the effective takes are seen to be substantially less, with many in the 15% - 30% range. The variation in the percentage take is seen to be quite substantial. This depends on (1) the extent to which field production income is sheltered by the new allowance, and (2) the importance of the tax relief on pre-production investment in relation to the subsequent taxable income. The results in Charts 37 and 38 show the tax takes in relation to the NPV/I ratios.

Broadly speaking it is seen that the effective tax takes decrease as the NPV/I ratio decreases: the relief is very mildly progress in its impact. Chart 38 shows the triggered fields only, and, on the methodology followed, it is seen that the level of take is quite low.

Chart 37

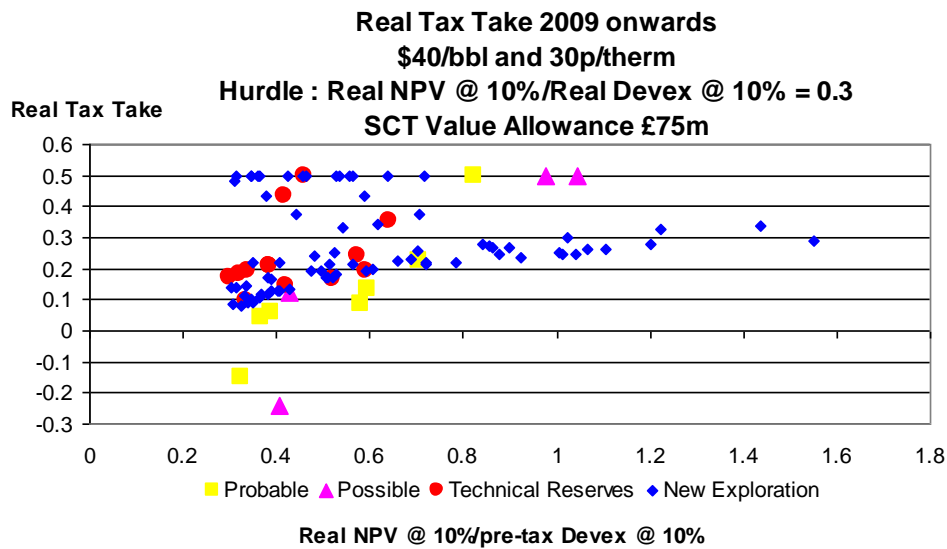
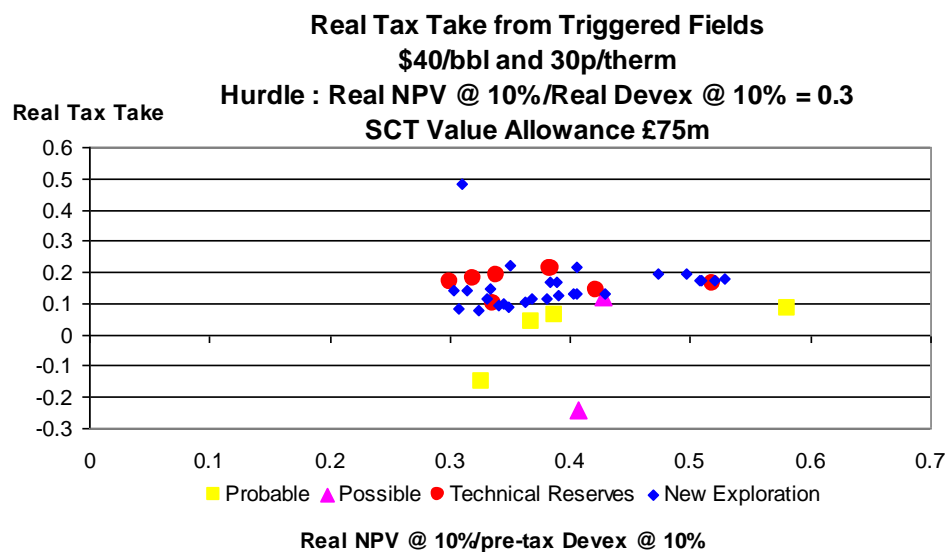


Chart 38



In Chart 39 the tax takes on all future fields are shown under the \$60, 50 pence case. Again many fields continue to face a tax rate of 50%, but others face substantially lower rates, with many in the 20% - 30% range. In Chart 40 the rates on the triggered fields are isolated. The effective tax rates are mostly relatively low, but the range is quite wide. Broadly speaking the effective tax rates are mildly progressive in relation to field profitability as measured by the NPV/I ratios.

Chart 39

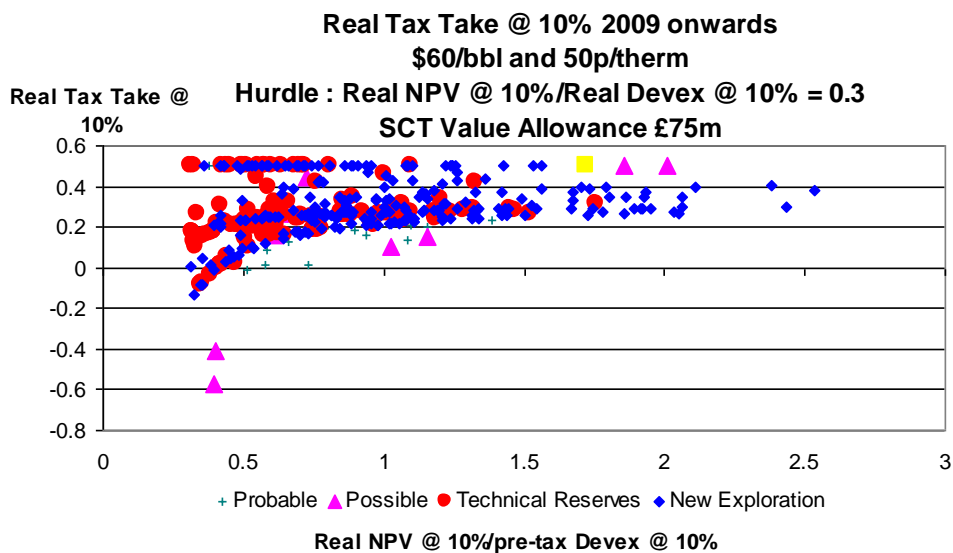
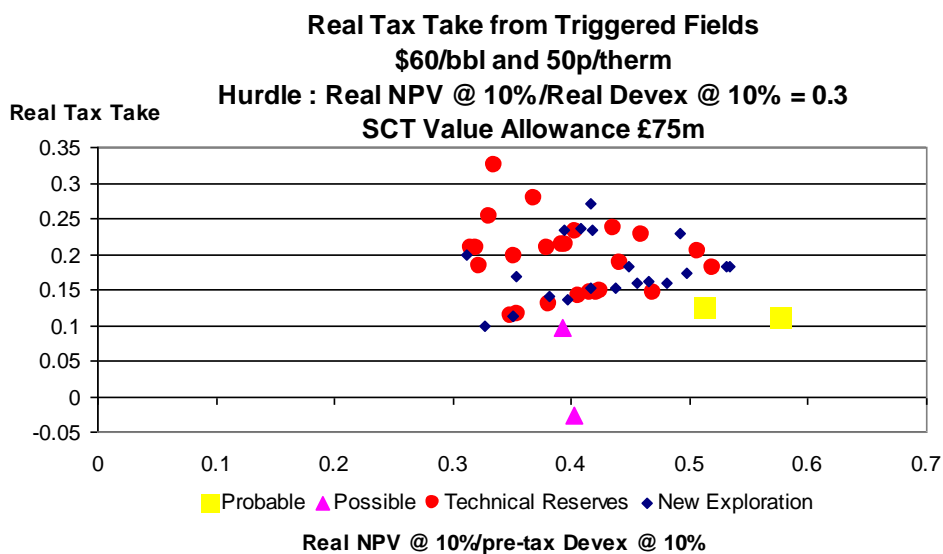


Chart 40



In Chart 41 the tax takes under the \$80, 70 pence scenario are shown for all new fields. It is seen that, while many fields remain subject to the 50% rate, large numbers have effective rates well below this level. Broadly, the impact of the new allowance is seen to be mildly progressive in relation to field profitability as measured by the NPV/I ratio. In Chart 42 the tax rates facing the triggered fields are isolated. They are relatively few in number because in this price scenario most new fields passed the economic hurdle under the pre-budget tax terms.

Chart 41

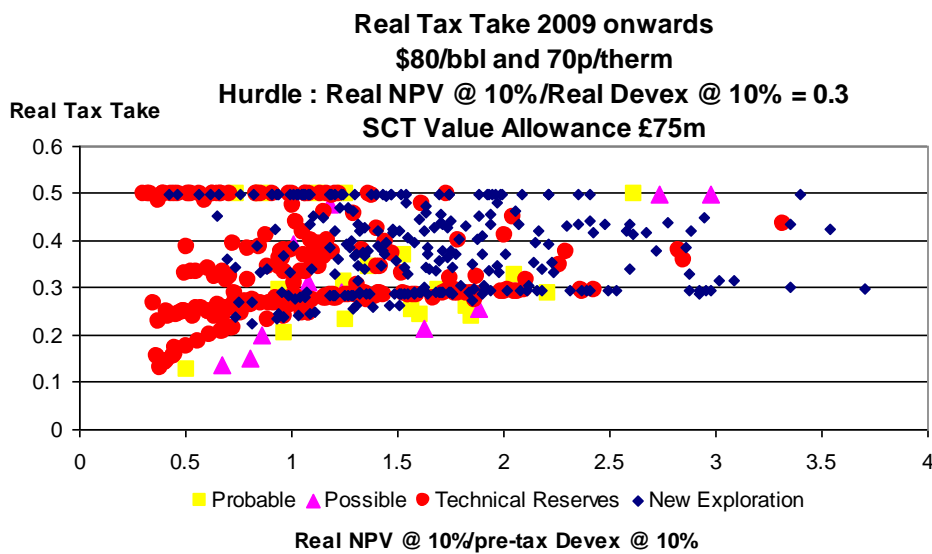
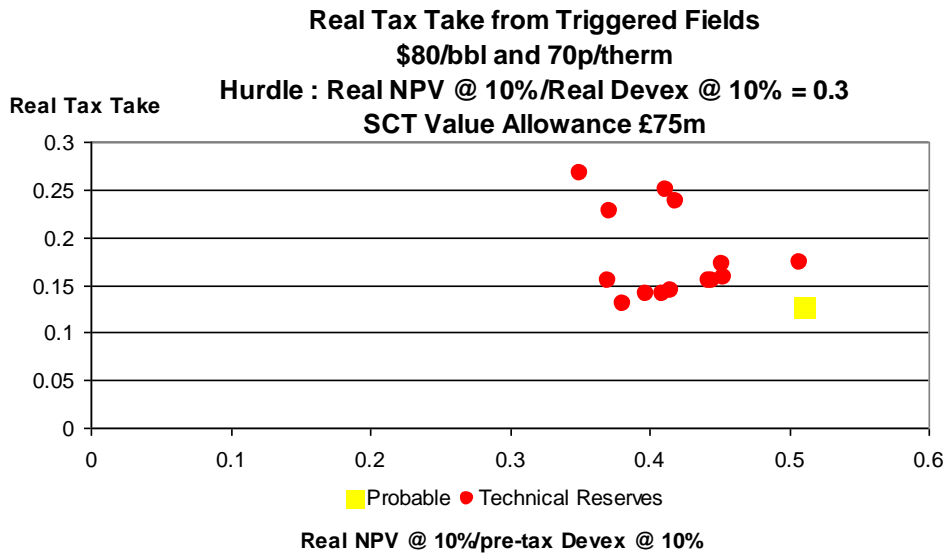


Chart 42



(g) West of Shetlands

Because of the interest in and problems involved in expediting new developments in the West of Shetland region it was felt useful to separate out the potential effects of the new allowance for small fields on activity there. The results in terms of numbers of field developments triggered are shown in Tables 13 – 15 under the 3 oil/gas price scenarios. It is seen that under the \$40, 30 pence case (Table 13) 25 fields fail the economic hurdle under the pre-budget terms but they also fail after the introduction of the £75 million allowance. Under the \$60, 50 pence case (Table 14) 15 fields fail the hurdle under the pre-budget terms and continue to do so after the £75 million allowance. Under the \$80, 70 pence case (Table 15) the great majority of fields pass the economic hurdle under the pre-budget terms. One further development is triggered by the £75 million allowance. It is likely that for price scenarios between \$60, 50 pence and \$80, 70 pence the allowance could trigger further developments.

Table 13

Potential new Field Developments in WoS 2009 – 2035

<b>\$40, 30 pence case</b>			
	Pass Pre-Budget '09	Fail Pre-Budget '09	Triggered by £75m. value allowance
Probable	0	1	0
Possible	0	0	0
Technical Reserves	0	17	0
New Discoveries	1	7	0
<b>TOTAL</b>	<b>1</b>	<b>25</b>	<b>0</b>

Table 14

Potential new Field Developments in WoS 2009 – 2035

<b>\$60, 50 pence case</b>			
	Pass Pre-Budget '09	Fail Pre-Budget '09	Triggered by £75m. value allowance
Probable	1	0	0
Possible	0	0	0
Technical Reserves	12	14	0
New Discoveries	8	1	0
<b>TOTAL</b>	<b>21</b>	<b>15</b>	<b>0</b>

Table 15

Potential new Field Developments in WoS 2009 – 2035

<b>\$80, 70 pence case</b>			
	Pass Pre-Budget '09	Fail Pre-Budget '09	Triggered by £75m. value allowance
Probable	1	0	0
Possible	0	0	0
Technical Reserves	25	3	1
New Discoveries	9	0	0
<b>TOTAL</b>	<b>35</b>	<b>3</b>	<b>1</b>



### **C. Effects of Allowance for Ultra Heavy Oil Fields**

With the data base available to the present authors it is not clear how many fields would qualify for the ultra heavy oil fields allowance. It was decided to test the effects of the £800 million allowance on a set of 12 fields which might qualify for it. The results under the \$40, 30 pence case were that nearly all the fields failed the hurdle under both the pre-budget and post-budget terms with no extra developments being triggered. Under the \$60, 50 pence case a small majority of the fields passed the hurdle under pre-budget terms and one development was triggered by the allowance. Under the \$80, 70 pence case 11 out of 12 fields passed the hurdle under pre-budget terms. It is thus possible that within the price range \$60, 50 pence — \$80, 70 pence the £800 million allowance has stronger effects<sup>2</sup>.

### **D. Effects of Allowance for Ultra HP/HT Fields**

It is understood that only 1 present discovery qualifies under the very stringent twin criteria relating to temperature and pressure in the budget proposals. It is also understood that several other fields would qualify if the criteria were made less stringent and/or only one of the two criteria had to be met.

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<sup>2</sup> The effects of the allowance for heavy oil fields on tax revenues are not shown here but can be obtained from the authors

## **E. General Effects of Other Budget Proposals**

The effects of the budget proposals regarding capital gains taxation should be significantly positive for activity in the UKCS. Some licensees are willing to sell or swap assets which are deemed to be non-core to their own portfolios to other players to whom they may be more valuable. Mature fields constitute the main examples. Currently there is the possibility of capital gains tax applying to the transaction, though this can be postponed for 10 years if the proceeds are reinvested.

By providing that, when the proceeds from disposals are reinvested in the UKCS, no chargeable gain arises, a significant hurdle to such transactions has been removed. As the UKCS matures it can be expected that there will be further scope for such asset transactions.

## **4. Conclusions**

The tax proposals in Budget 2009 provide evidence that the UK Government appreciates that tax incentives are required to produce maximum economic recovery from the UKCS. The new field allowance for small fields could trigger the development of around 50 new fields under a \$60, 50 pence price scenario in the period to 2035, and over 40 under a \$40, 30 pence price scenario. Lower numbers would be triggered under an \$80, 70 pence price case because most fields would be viable under the pre-budget terms. The cumulative extra production triggered to 2035 could be nearly 440 million barrels of oil equivalent (mmboe) under the \$40, 30 pence case, and 360 mmboe under the \$60, 50 pence case. Triggered field investments in the period could be £3.5 billion (at 2008

prices) under the \$40, 30 pence case and £4.3 billion under the \$60, 50 pence case. Triggered field operating costs could be £2.85 billion under the low price case and £3.75 billion under the medium price case. These effects on activity in the UKCS may be described as modest but very worthwhile.

In the West of Shetlands region it was found that the allowance for small fields did not have a significant effect in enhancing activity, but it is possible that within the price scenarios of \$60, 50 pence — \$80, 70 pence the effects could be stronger. It is also quite possible that a larger allowance applicable to all new developments in the West of Shetlands region would have a stronger effect. Given the special difficulties of developing new fields in this region due to the particularly high costs and lack of adequate infrastructure there is merit in considering a larger allowance applicable to all new fields for this frontier region.

With respect to heavy oil fields the modelling found that the field allowance had a modest effect in triggering new developments. It is possible, however, that within the price range \$60, 50 pence — \$80, 70 pence the effect could be significantly stronger.

With respect to HP/HT fields the effects of the new allowance will be tiny because only one discovery is understood to qualify. Given that there are worthwhile numbers of (very high cost) fields generally regarded as falling within the HP/HT category there is merit in making the qualifying criteria less stringent. Thus the qualification could readily be HP or HT rather than both HP/HT. Consideration should also be given to modifying the specific pressures and temperatures to acknowledge the

need for further incentives to facilitate the development of these very difficult reservoirs.

The proposed changes to capital gains taxation should have a positive and worthwhile effects in reducing impediments to asset transactions. The facilitation of asset transactions is widely recognised as being helpful to the attainment of maximum economic recovery from the UKCS.

Budget 2009 did not address all the current taxation issues currently encountered in the UKCS. The most pressing other issue relates to incremental projects in mature PRT-paying fields. Currently these are subject to an overall tax rate of 75%. The discrimination against such projects compared to those in new fields has been increased as a consequence of the new field allowances. But the potential contribution of these projects to total economic recovery from the UKCS is substantial. This is clearly seen from Table 6 above. Further, recent modelling by the present authors clearly shows that the presence of PRT and CT/SC can discourage investment in incremental projects.<sup>3</sup> While the case for early abolition of PRT (such as with a buy-out scheme) remains strong (and would greatly encourage the development of incremental projects), a targeted PRT investment relief could also enhance incentives to a worthwhile extent. A PRT uplift for all incremental projects is an obvious incentive within the spirit of this tax, and there is a clear case for considering it.

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<sup>3</sup> For details see A G Kemp and L Stephen, "Incentivising Investment in the UKCS: a Response to *Supporting Investment: a Consultation on the North Sea Fiscal Regime*, North Sea Study Occasional Paper No. 111, by A.G. Kemp and Linda Stephen, University of Aberdeen Department of Economics, February 2009, pp. 93.

Budget 2009 did not contain specific new incentives for players without immediate tax cover. The financial crisis has made it much more difficult for such licensees to raise external funds whether debt or equity. They are clearly disadvantaged compared to licensees who have tax cover and can obtain early relief for their expenditures. There is a case for making the playing field level, given the growing importance of new players to actively in the UKCS. If the Government directly shared in the costs of exploration as is done in Norway the result could be a worthwhile increase in exploration at relatively low cost to the Government. Currently, exploration has dropped to a worrying extent and an incentive to players without tax cover perhaps for a specific, limited time period could help to reverse the recent sharp decline.

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