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Financial Liability for Decommissioning in the UKCS: the Comparative Effects of LOCs, Surety Bonds, and Trust Funds

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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

For 2006 the programme examines the following subjects:

a) Infrastructure Availability in Long-Term (post 2020) and Terms of Access after 2003 PRT Change and New Code Of Practice
b) Effects of Any Upstream Tax Changes on UKCS
c) Economic Analysis of Exploration Success since c. 2000
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Contents   Page

Financial Liability for Decommissioning in the UKCS: the Comparative Effects of LOCs, Surety Bonds, and Trust Funds

1.   Introduction

The subject of the decommissioning of oil and gas fields in the UKCS has many facets. One of the main economic ones relates to the financial liability for the activity. In the UK there is clear joint and several liability among co-licensees. Further, the Government can request, and in some circumstances require, a licensee to provide financial security for the prospective decommissioning costs. Asset transactions involving mature fields have become increasingly common with some companies specialising in maximising economic recovery from mature fields. In such cases while the decommissioning obligation may be transferred from the initial licensee to the new one the Government may insist that liability stays with the original one if there are doubts about the financial competence of the new licensee to fulfil the work obligation.

Requests by the Government to provide financial security are conventionally triggered when the remaining net present value (RNPV) from a field falls below a threshold value in relation to the (gross) decommissioning costs. A trigger value of 150% of decommissioning costs is common. Nowadays very small field developments are not uncommon. In such circumstances the DTI can also request financial security for decommissioning to be provided at the time of the field development. This is to protect the Government against a major reservoir failure which could take effect at the date of early production.

While a considerable number of schemes can in principle deal with the problem in the UK Letters of Credit (LOCs) are the only instrument currently employed. These involve the payment of a fee to the bank providing the guarantee. The

fee is tax deductible for corporation tax (CT), Supplementary Charge (SC) and Petroleum Revenue Tax (PRT), but the LOCs have to be disclosed in the company's accounts and they impact on its borrowing capacity and costs.

Other methods of providing security for decommissioning include Surety Bonds and Decommissioning Trusts. Surety Bonds are used in the Gulf of Mexico by the Minerals Management Service (MMS). The Bond issuer is generally essentially an unsecured creditor who requires an indemnity from the licensee. Although assets of the licensee are not routinely required as collateral, the indemnity permits the bond issuer to call for collateral when he feels this is necessary. The bond provider will regularly monitor the situation of the licensee, checking whether he is making proper provision for decommissioning and what other assets he has available. There will be a limit of the value of a bond which a surety company would issue to a licensee. Unlike LOCs Surety Bonds do not need to be disclosed by the licensee and so they do not affect his credit rating. In the Gulf of Mexico the MMS decides what level of surety is required by a licensee. The bond issuer generally agrees to have the work undertaken if the licensee is unable to fulfil his decommissioning work obligation. This is in contrast to the situation with the LOC scheme. In the present study to facilitate ready comparison with the typical LOC the bond was assumed to be required when field RNPV reached 150% of gross decommissioning costs.

Decommissioning Trust Funds or variants on them such as escrow accounts have become increasingly common over the last 15 years or so in different parts of the world. They involve the deposit of Funds by licensees into an alienated Fund (or escrow account) such that the contributions plus any net income earned by the Fund accrue to meet the decommissioning costs. It is again assumed for purposes of ready comparison with the other schemes that

contributions commence when RNPV reaches 150% of gross decommissioning costs. The application of this simple formula sometimes meant that there was a shortfall in the Fund in relation to the decommissioning costs. In such cases the amount of the shortfall was relieved against tax (CT, SC, and PRT) as appropriate under current tax rules when the expenditures were incurred. These rules currently do not permit contributions to a Trust Fund to be tax deductible. This is a severe impediment to the use of this scheme. In other countries where they exist tax deductibility for the contributions exists. An example of a licensing system comparable to the UK is Namibia. In several other jurisdictions where Production Sharing Contracts are the norm contributions to Funds or escrow accounts are cost recoverable and tax deductible. Notable examples are Angola, Azerbaijan and Sakhalin.

In this study the cases where contributions to Trust Funds are (a) non-deductible and (b) deductible are both examined to highlight the large differences which emerge. In the UK discretionary trusts would be the relevant vehicles which would be employed to implement the Decommissioning Trust concept. Under current tax rules the income from monies invested in such trusts would be taxed at 40%. Further, there would be a liability to Inheritance Tax after 10 years (at 6%) and when Funds were withdrawn to pay for the decommissioning work (at 20%). The application of Inheritance Tax in this manner would be so punitive as to inhibit the application of the whole scheme. It is also unattractive to investors if the contributions are not tax deductible.

In the study the modelling of the effects of the schemes has been undertaken to reflect current market conditions. Thus for the LOC the fee has been set at 1.5% of the decommissioning cost after taking into account the potential contribution from the net cash flows while the field is still producing. Thus the base for the LOC cost would increase as the field approached the cessation of

production point as the field revenues decreased. The increase in the borrowing costs from the LOC scheme was assumed to be the base interest rate currently at 4.75%. The base to which this applied was taken to be the same as for the fee for the LOC.

For the Surety Bond the costs were assumed to be 3.5% of the decommissioning cost again taking into account the contributions from remaining field net cash flows, with the cost payment thus increasing as the field net cash flows declined.

With the Trust Fund the assumption was that the contributions would follow the production curve after payments were triggered. Thus the contributions would decline from the trigger point onwards. For modelling purposes the size of the contributions was assumed to take into account the (net) income earned on the sums invested in the Fund. Discretionary Funds of this type are permitted to invest in a prudent selection of equities and bonds. Given the volatility of financial markets over the years it was decided to model two cases. Under the first the return on the monies invested was a modest 4.75% in MOD terms and under the second it was 10% again in MOD terms.

Under current practice the DTI exercises discretion regarding which licensees it requests financial security from. This involves much judgement regarding the risks involved form the Government's viewpoint. The present study avoids these major judgements and concentrates on examining the comparative costs and effects of the schemes as applied to all fields in the UKCS from 2006 onwards. The analysis highlights the comparative costs and effects of the schemes as seen from the viewpoint of investors and the Treasury as custodian of the taxpayer's interests. The costs involved are inevitably higher when

applied to all fields, but they can be scaled down to reflect the application of the schemes on a selective basis.

The study highlights not only the direct costs to investors and the Treasury but also the effects of lost production and field expenditures from changes in behaviour brought about by the introduction of the schemes. Lost production can emanate from two sources namely, (1) earlier cessation of production from developed fields from payment of the fees and perhaps Trust Fund contributions, and (2) marginal field developments deterred as a consequence of the payments. With respect to the Trust Fund it is not at all clear whether behaviour would change as a consequence of making payments into a Fund. While net cash flows are reduced when contributions are being made they are improved later when the decommissioning work has to be undertaken. Accordingly cases where behaviour is changed and unchanged are both considered.

The possible changes in behaviour with respect to cessation of production relate to the perceived need of the investor to avoid continuing production while making a net operating loss. Thus there could be an incentive following the introduction of the schemes with the associated payments to accelerate cessation of production. Similarly, if a field or incremental project is very marginal there can be an incentive not to develop the project at all. These possibilities are examined in detail in the study.

The Government clearly needs to optimise its risks with respect to the decommissioning liability problem. The present study in effect shows the costs to investors and the Treasury resulting from the Government deciding to procure assurances against all the risks. This provides a base from which

judgements can be made about the possible effects of the Government accepting different degrees of risk.

This issue comes up when mature assets are sold but the provisions of Section 29 of the Petroleum Act 1998 have not been withdrawn and/or threats of liability under Section 34 of the same Act remain. The sellers would clearly desire to be released from Section 29 and have the Section 34 powers removed, and these issues could affect their attitude to asset transactions which otherwise from a national viewpoint could be very desirable. The question of how financial security is best handled then arises. The present study gives insights into the pros and cons of different options.

2.   <u>Data, Methodology, and Modelling Assumptions</u>

Three large databases incorporating basic field-related data for all of the UKCS has been built up over many years in the Department of Economics, University of Aberdeen. Data on all investment expenditures, operating costs, production, and decommissioning costs are incorporated in these databases. The UKOOA field database (late 2005 vintage) contains sanctioned fields (316), incremental projects (112), probable fields (19) and possible fields (23) that have been validated by the operators of the fields concerned. The fields in question relate to all those developed since the 1960's, including those which have development approval but are not yet producing. Also included are future fields which have not yet received development approval but are seriously being considered for development by the operators concerned. The second database consists of technical reserve fields (215) which are updated annually. It includes some fields which were formerly in the "possible" field category but have been subsequently downgraded by the operators. The third database models potential new discoveries.

The exploration effort was based on a combination of the average effort since 1997 and prospective oil/gas price behaviour.

Three oil/gas price scenarios were used as follows:

	Oil Price (real) $/bbl	Gas Price (real) Pence/therm
High	40	36
Medium	30	28
Low	25	24

The number of exploration wells, shown below, associated with each price scenario was assumed to decline linearly over time.

	2006	2030
High	50	38
Medium	38	27
Low	31	20

The exploration success rates were based on a combination of the experience since 1997 and the size of effort. It has been assumed that with the higher the effort more discoveries are made but the lower becomes the success rate as more risky prospects become targeted. The success rate for the whole of the UKCS with a medium effort is 23%, with a high effort 19% and with a low effort 24%. These are in line with historic experience. It is also assumed that technological progress will maintain these success rates in the period to 2030. The aggregate historic data on (i) exploration effort and (ii) discoveries were disaggregated according to the main regions, namely SNS, CNS, MF, NNS, WoS and IS. Regional trends were established for the relative exploration effort, discoveries and success rates in each of these regions and the data was also split according to reserve type (oil, gas and condensate). Armed with this information Monte Carlo simulation was undertaken to project discoveries in all six regions in the period to 2030.

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.

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 for the different scenarios:

High	22
Medium	20
Low	17

The constraint took the form of curtailing the number of fields in the technical reserves category going ahead in any one year. The Monte Carlo technique was used to project through time the particular fields in this category which could be developed.

The total numbers of field developments were also constrained by an economic hurdle. Costs of capital of 10% and 15% in real, post-tax terms were employed and minimum NPVs of £10 million required to reflect the risk: reward relationship and the competitive position of the UKCS in relation to the other opportunities around the world.

Regarding incremental projects those currently being examined should mostly be executed in the next 3 years if they pass the economic hurdle.

It is very likely that further incremental projects will be examined in medium/longer term. To obtain an understanding of the 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. The execution of the additional incremental projects depends on the prolongation of the lives of the infrastructure and possibly other incentives. There are no guarantees that these extra projects will be undertaken.

The results of the modelling were tested against the official published data for the whole of the UKCS. The results of the present study for the historical period were found to be consistent with those from the official data.

The modelling was undertaken initially on the assumption that no financial security arrangements were in place and that the decommissioning obligations were fulfilled. On this basis the economic modelling calculated the cessation of production (COP) dates and thus economic recovery from the fields. New investments in incremental projects and fields were triggered in accordance with the economic criteria discussed above.

The modelling subsequently repeated these exercises in turn with the application of the different schemes for providing security for the decommissioning liability. The results then highlighted any differences in hydrocarbons recovered taking into account differences in COP and in new developments. The different behavioural adjustments which could be made by investors are also highlighted.

The decommissioning costs in this study are as estimated by the operators for the sanctioned fields, incremental projects, probable and possible fields. For the technical reserves, future incremental projects, and new discoveries the authors' estimates, based on averages from the costs given by the operators, have been used.

The costs include the decommissioning of field facilities and well-capping etc., and the removal of infield pipelines, but they exclude the decommissioning of trunk pipelines and terminals. Drill cuttings are assumed to remain in situ.

3. Results

a) Without Financial Security Scheme

Charts 1, 2 and 3 show the number of potential fields in production under the 3 price scenarios. There will also be incremental projects but these are not shown.

Chart 1

Potential Number of Fields in Production
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
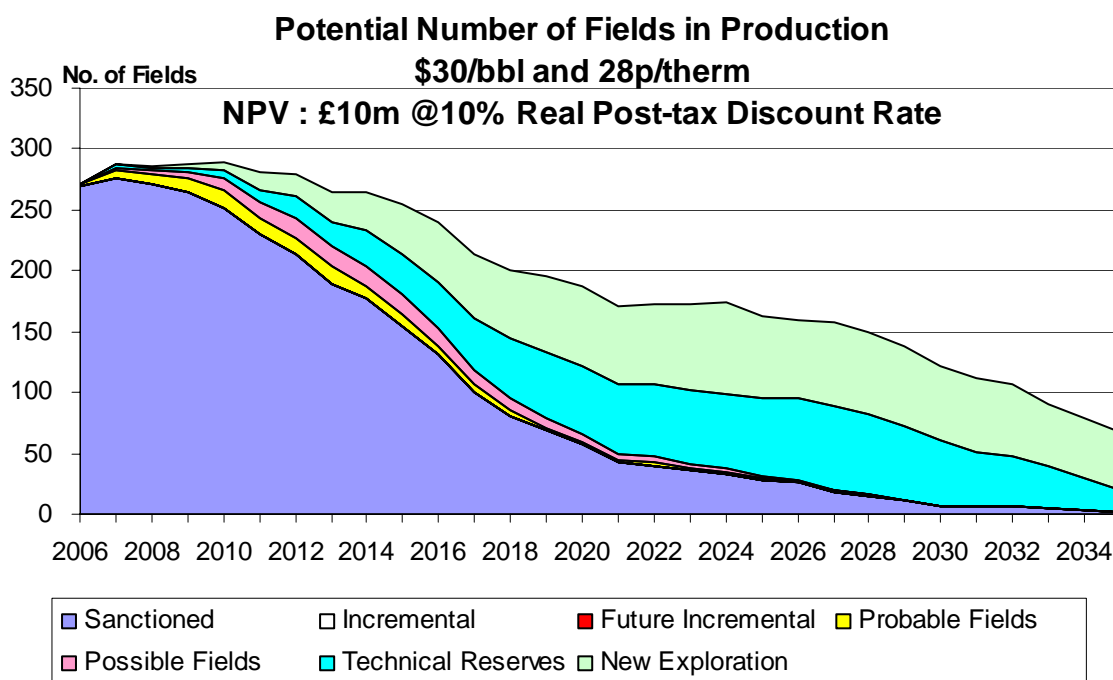
With the medium price the number of fields in production will peak at 289 in 2010 but the number of sanctioned fields will peak in 2007 at 276 fields. The sanctioned fields dominate the total until 2017. The increasing number of fields reaching COP is a key feature.

Chart 2

**Potential Number of Fields in Production
$40/bbl and 36p/therm**
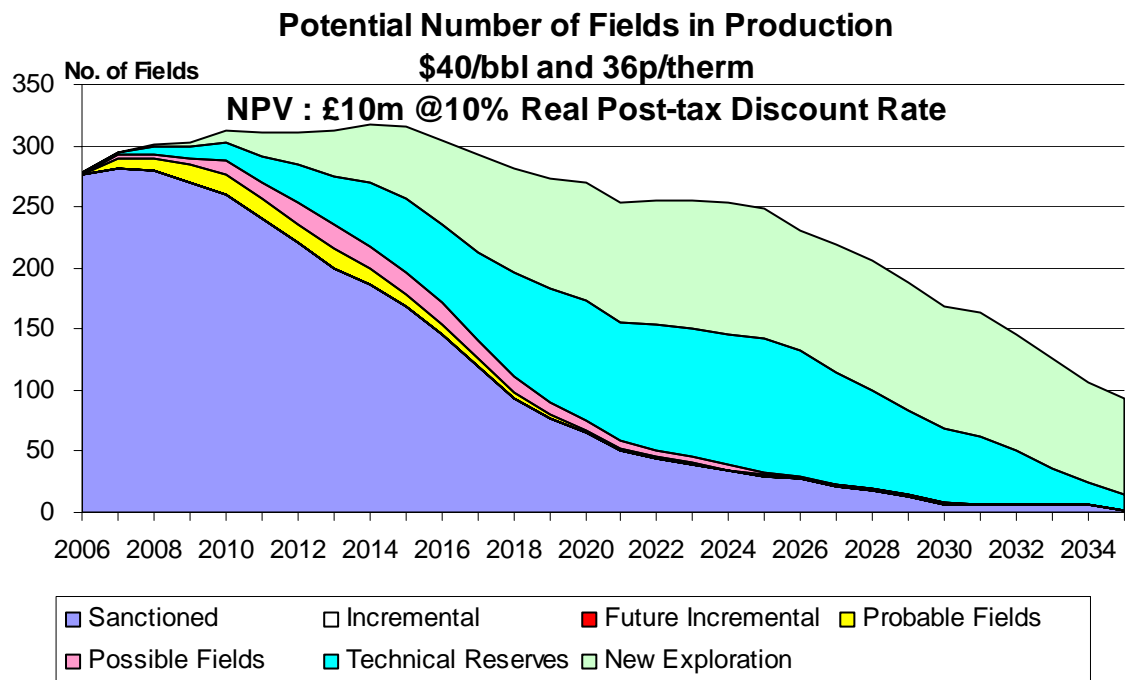
With the high price the number of fields in production will peak at 317 in 2014 but the number of sanctioned fields will peak in 2007 at 282 fields. The sanctioned fields dominate the total until 2016.

Chart 3

Potential Number of Fields in Production
$25/bbl and 24p/therm
NPV : £10m @10% Real Post-tax Discount Rate
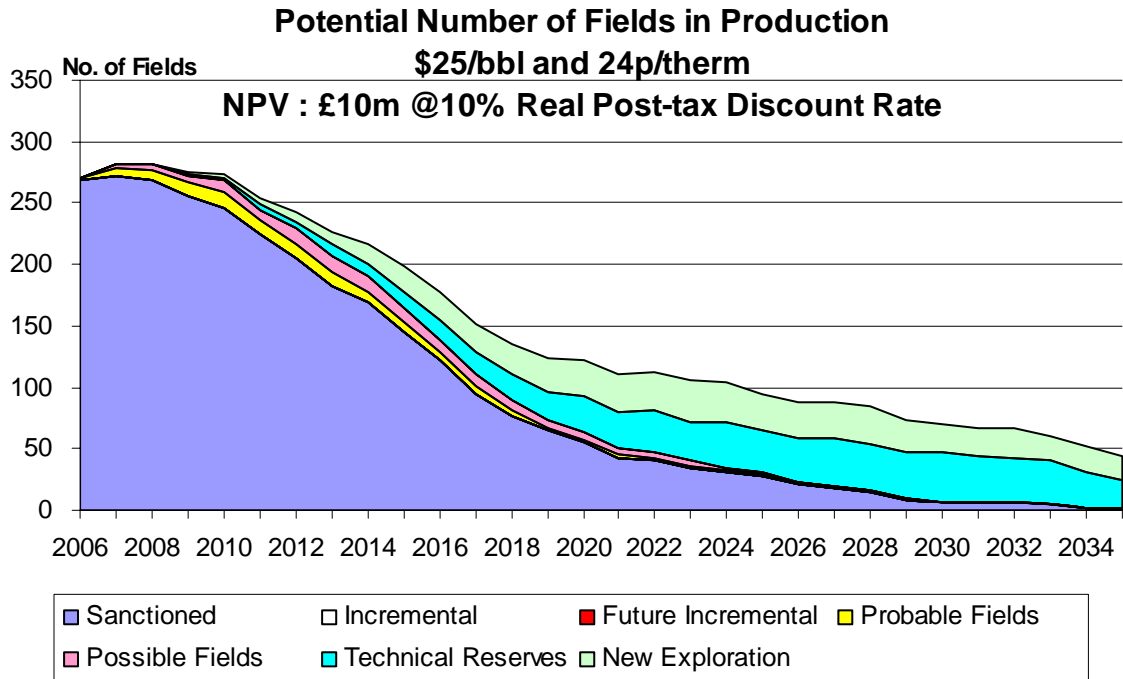
With the low price the number of fields in production will peak at 282 in 2008 but the number of sanctioned fields will peak in 2007 at 272 fields. The sanctioned fields dominate the total until 2020.

The cumulative decommissioning costs to 2035 are shown.

Cumulative Decommissioning Costs 2006-2035			
	£ billion (rounded, 2006 prices)		
	$25, 24p	$30, 28p	$40, 36p
Sanctioned + Incremental	11.09	11.11	11.15
Probable Fields	0.07	0.14	0.14
Possible Fields	0.11	0.12	0.13
Technical Reserves	0.89	1.67	1.93
New Discoveries	0.96	1.41	1.85
Total	**13.12**	**14.45**	**15.20**

The potential decommissioning costs for the 3 price scenarios are shown in Charts 4, 5 and 6. The negative costs for incremental and future incremental projects represent the ability of the incremental projects to delay the COP dates for fields.

Chart 4

Potential Decommissioning Costs $30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Chart 5

Potential Decommissioning Costs
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 6

Potential Decommissioning Costs
$25/bbl and 24p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

14

It is clear from examination of the charts above that the oil/gas price affects both the timing of decommissioning and the total decommissioning cost to 2035. With higher oil/gas prices more fields pass the economic hurdle rate and there are more discoveries from new exploration. With lower prices decommissioning occurs earlier as the economic limits of fields are reached earlier.

b)   <u>LOC Scheme</u>

As noted above it is assumed that the LOC is instituted when remaining NPV (RNPV) falls to 150% of the gross decommissioning costs and that the requirement for LOCs continues until field decommissioning occurs. The LOC scheme starts in 2006. The modelling reflects behavioural changes namely (a) that accelerate decommissioning to avoid negative cash flows, and (b) that investment in very marginal projects may be deterred because of the LOC costs.

Chart 7 shows the LOC cost which obtains tax relief, Chart 8 shows the LOC costs (increase in cost of capital) which are not relievable for tax purposes[1] and Chart 9 shows the total LOC cost under the medium price assumption.

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[1] The increase in the cost of capital emanates from the reduction in debt capacity resulting from the LOC. To some extent this can be tax deductible. In the case of the UKCS loan interest is allowed against CT but not against the SC nor PRT. The net reduction in debt capacity was taken to be 4.75% (the current base rate).

Chart 7

Potential Real LOC Relievable Costs
LOC : all fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 8

Potential Real LOC Unrelievable Costs
LOC : all fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

16

Chart 9

Potential Real Total LOC Costs

LOC : all fields

$30/bbl and 28p/therm

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration

Cumulative 2006-2035 (£m Real 2006)								
$30/bbl 28p/therm	Sanctioned	Incremental	Future Incremental	Probable Fields	Possible Fields	Technical Reserves	New Exploration	Total
LOC Relievable	1918	59	97	10	8	172	139	2404
LOC Unrelievable	6075	187	306	33	25	545	442	7612
Real Total Loc Costs	7993	246	403	44	33	716	581	10016

The cumulative total cost is a large burden on the industry.

Chart 10 shows the associated decommissioning costs which may cumulate to £14071m in the period to 2035.

Chart 10

Potential Real Decommissioning Costs

£m (2006)

LOC : all fields

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate
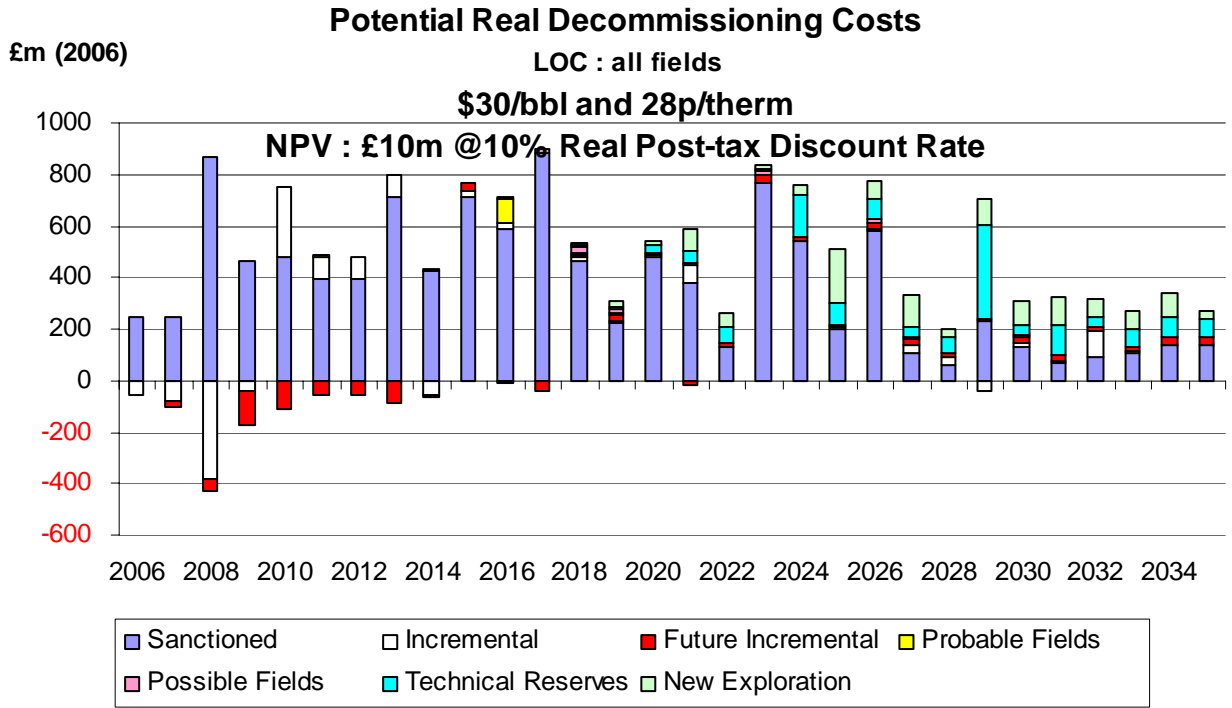
Chart 11 shows the total decommissioning relief under the medium price which may cumulate, with the LOC relief, to £9387m in the period to 2035.

Chart 11

Potential Real Decommissioning Relief (including LOC relief)

£m (2006)

LOC : all fields

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate
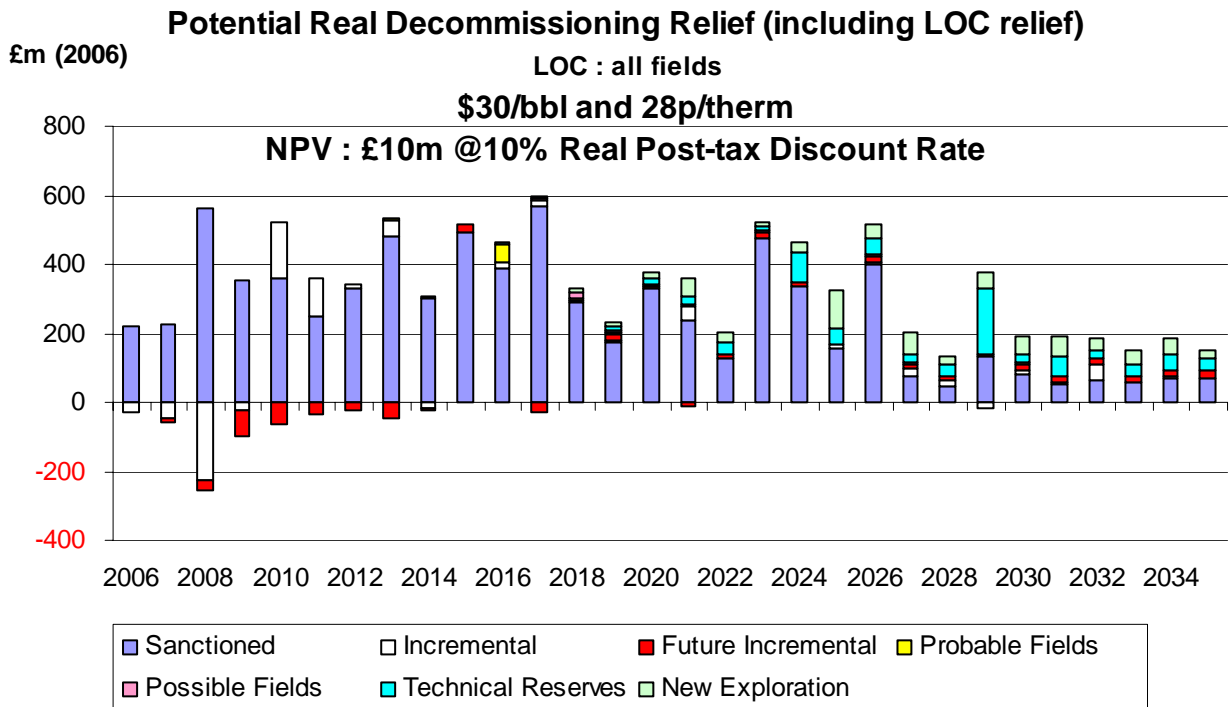
Chart 12 shows the relief given for LOC costs under the medium price and this may cumulate to £1543m in the period to 2035.

Chart 12

Potential Real LOC Relief
LOC : all fields
$30/bbl and 28p/therm
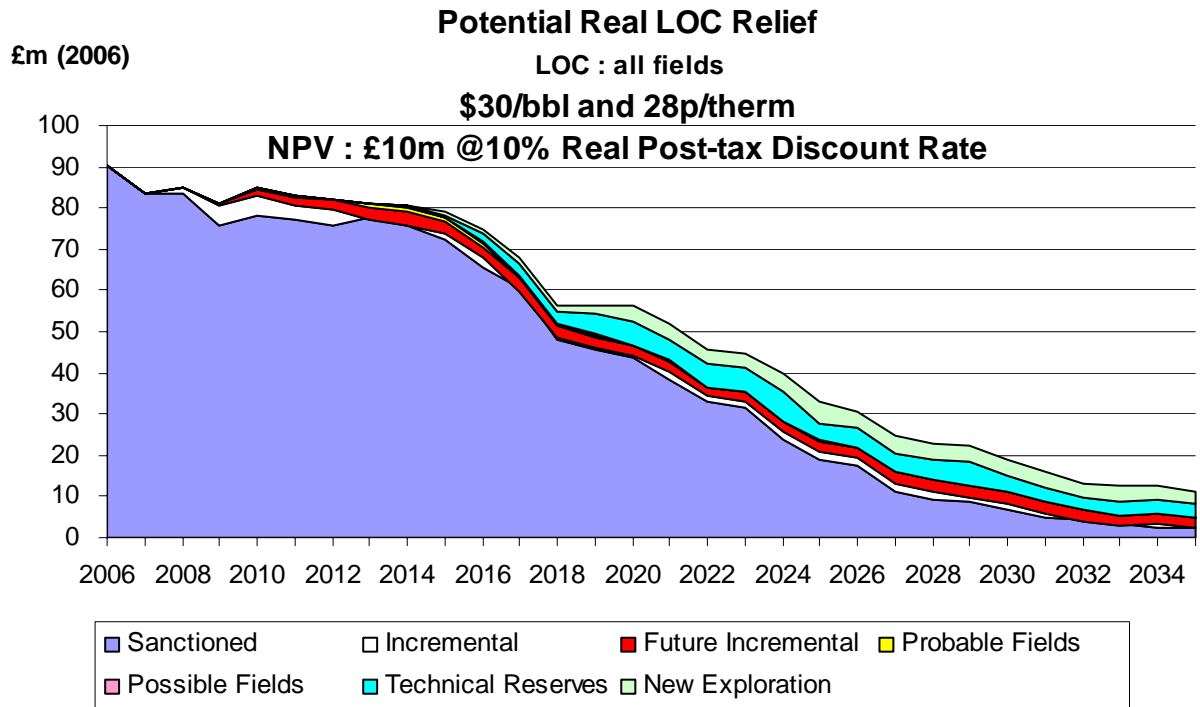
Chart 13 shows the total LOC cost minus LOC tax relief under the medium price. This may cumulate to £8473m in the period to 2035.

Chart 13

Potential Real Total LOC Costs minus LOC Relief

LOC : all fields

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
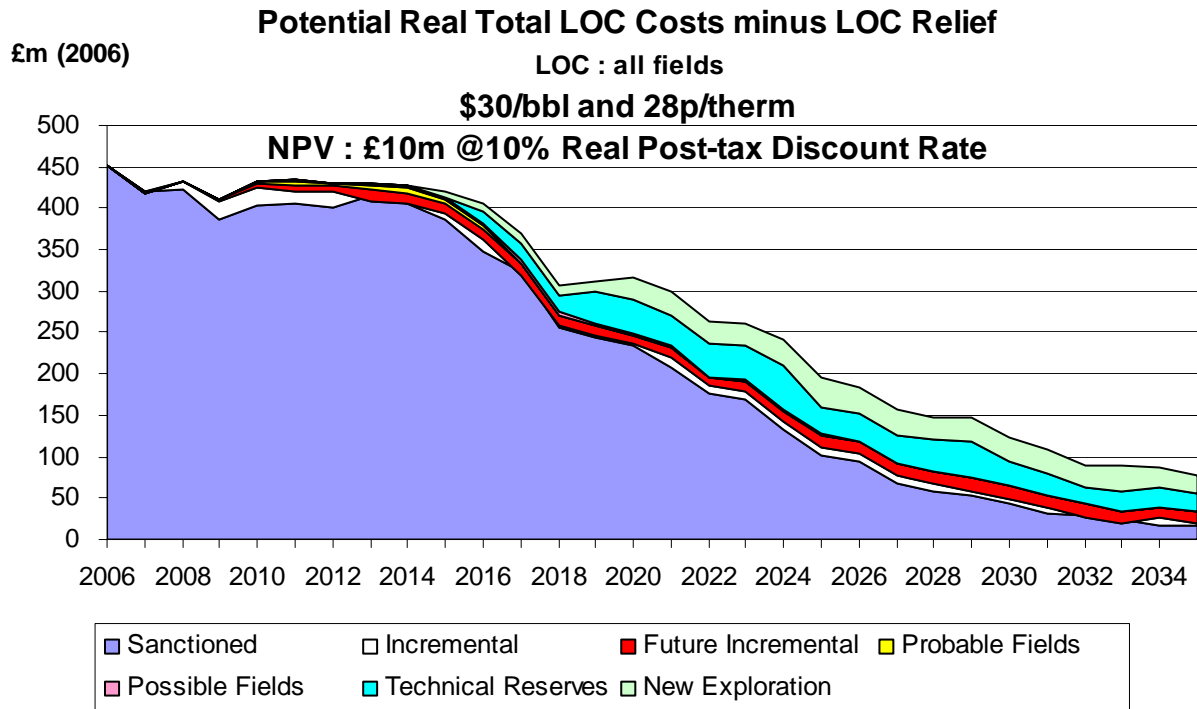
The introduction of an LOC scheme may accelerate the decommissioning date and/or it may make some projects or field developments uneconomic. Chart 14 shows the change in operating costs which may occur once all fields are involved in a LOC scheme. The results incorporate the increase in the total LOC costs (direct plus indirect).

Chart 14

Potential Change in Real Operating Expenditure (includes LOC costs)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
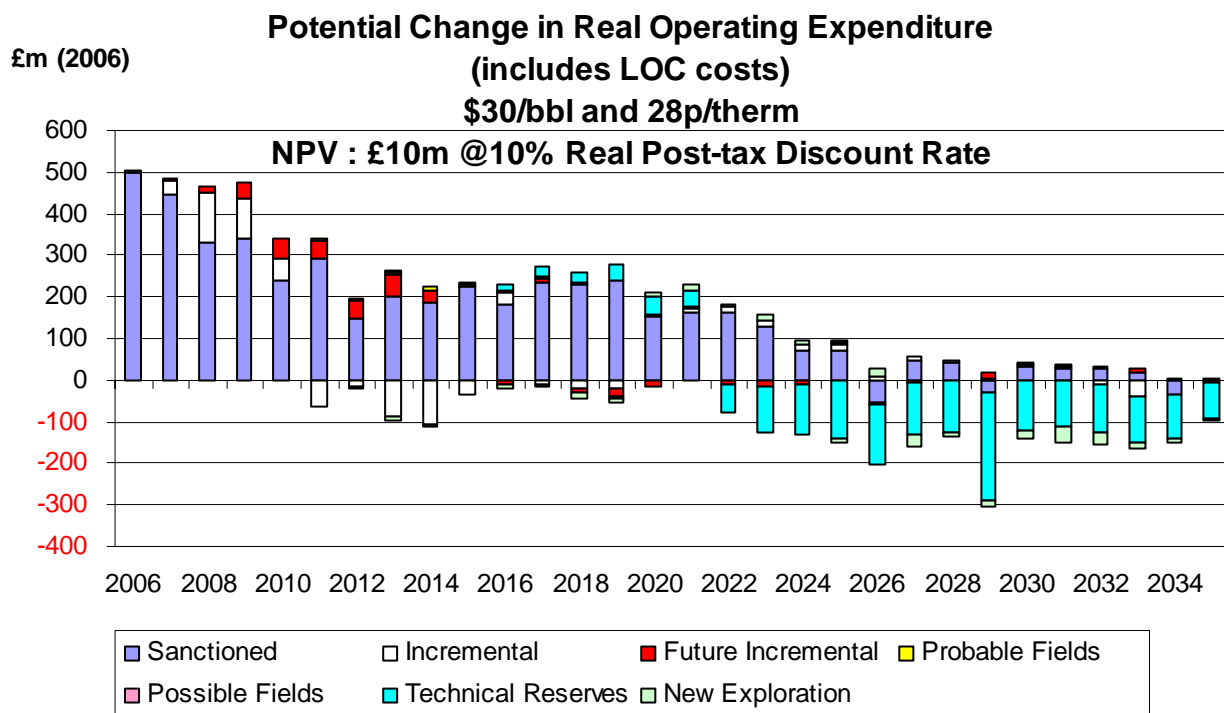
The change in operating costs plus LOC costs above for the sanctioned fields gives an indication of the extent of the acceleration in the decommissioning date. The change in operating costs plus LOC costs including the behavioural changes may cumulate to £3215m in the period to 2035.

Chart 15 shows the potential change in operating costs alone (excluding LOC costs) from the introduction of the LOC scheme under the medium price.

Chart 15

Potential Change in Real Operating Expenditure
LOC : all fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend:
- ■ Sanctioned
- □ Incremental
- ■ Future Incremental
- ■ Probable Fields
- ■ Possible Fields
- ■ Technical Reserves
- □ New Exploration
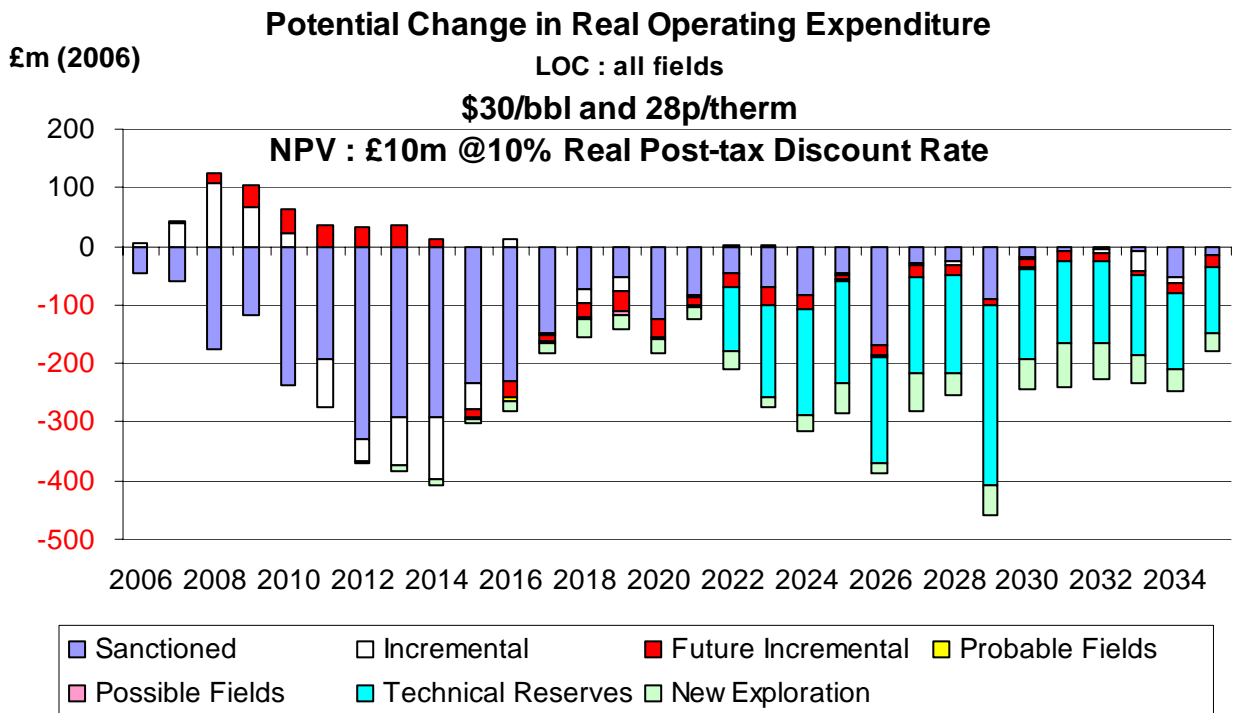
Cumulative operating expenditures (including behavioural changes) of £6,891 million may be foregone with the introduction of the LOC scheme.

Chart 16 shows the corresponding potential production which may be foregone. This could cumulate to 698Mboe by 2035.

Chart 16

Potential Change in Production
LOC : all fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
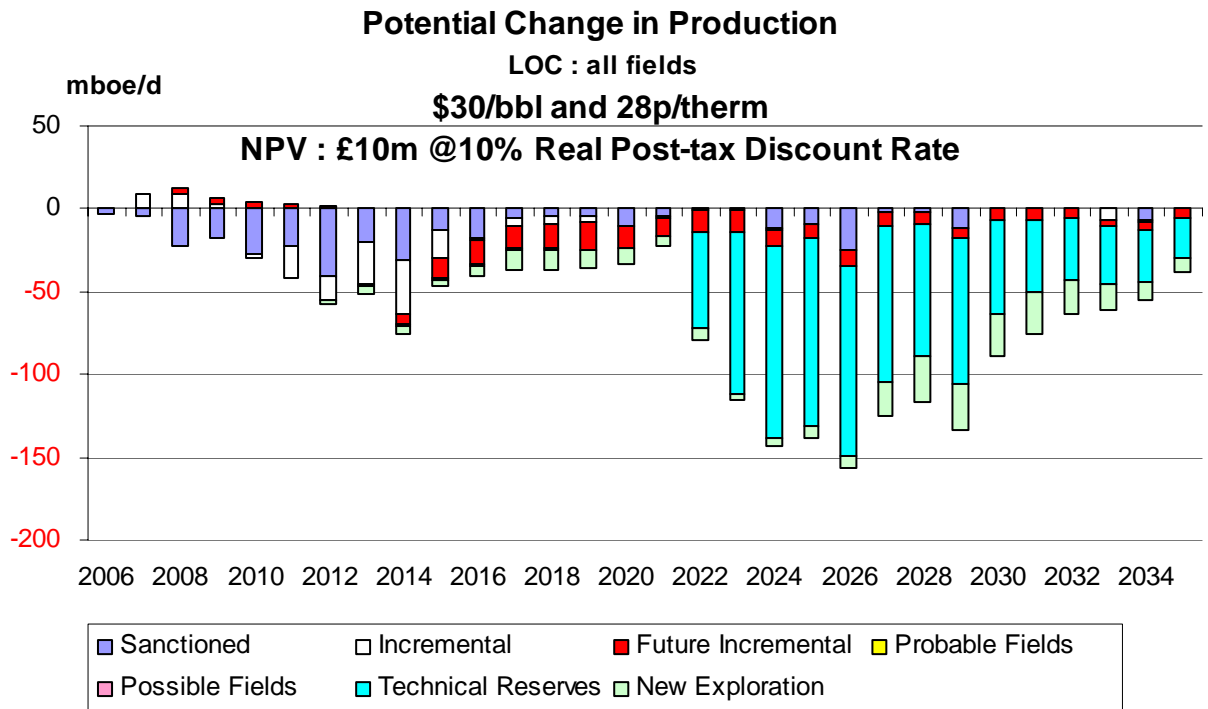
Chart 17 shows the corresponding development expenditure foregone which may cumulate to £3507m.

Chart 17

Potential Change in Real Development Expenditure
LOC : all fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
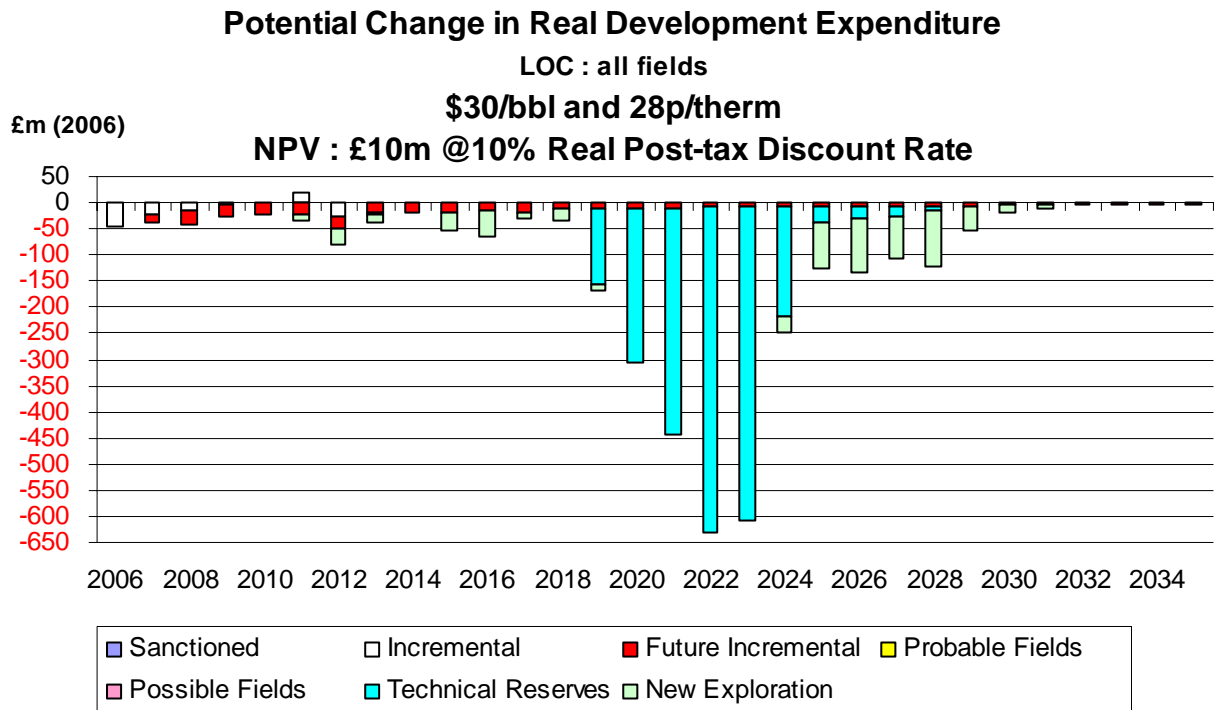
It should be stressed that by far the greater part of the reduction in expenditures and production occurs after 2020 and this is due to the failure of the marginal projects to pass the economic hurdle. Thus over 500 mboe is lost in this manner and £3.6 billion of investment.

Part of the LOC cost is relievable for tax purposes and the changed patterns of development and decommissioning which ensue from the introduction of an LOC scheme will affect the tax revenue received by the Inland Revenue. Chart 18 shows the change in tax revenues which would be expected with the introduction of the LOC scheme from the changes in the development and decommissioning dates.

Chart 18

Potential Change in Real Tax Revenue
Without LOC Relief
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
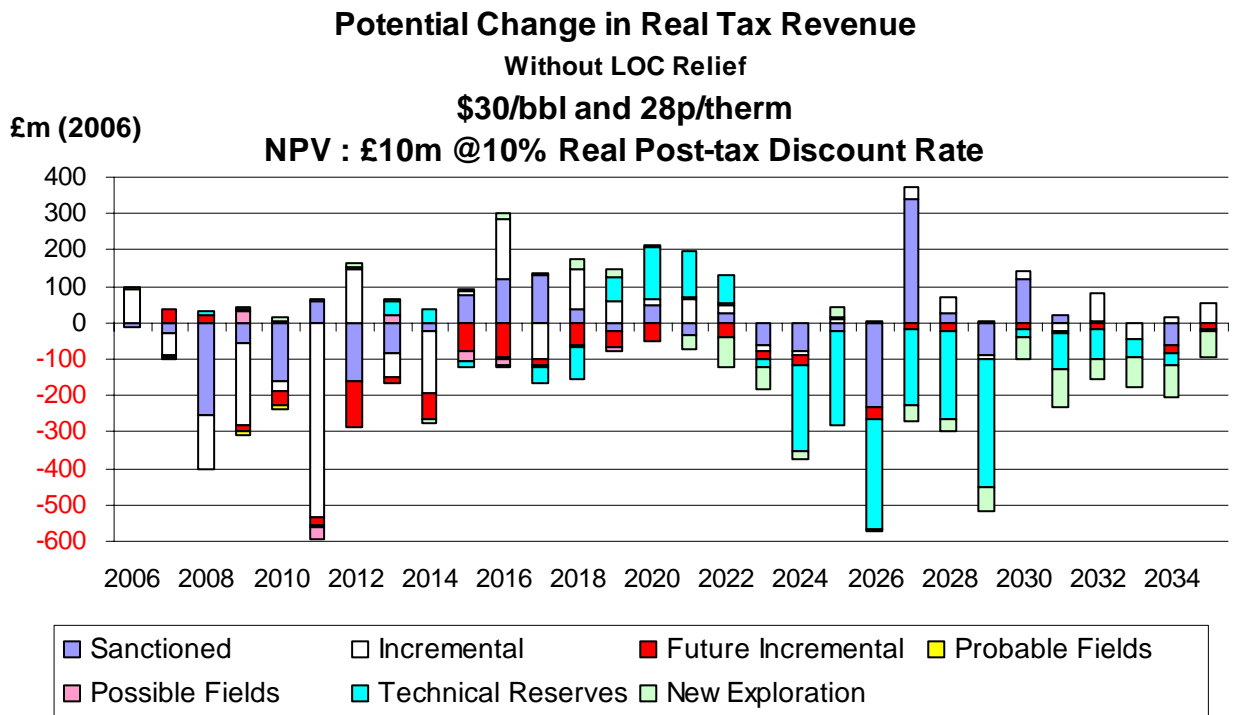
This may cumulate to a reduction in tax revenue of £3978m in the period to 2035. With LOC relief the cumulative total reduction in tax revenues is £5521m.

The results under the $40, 36 pence scenario are now discussed. Chart 19 shows the LOC cost which obtain tax relief, Chart 20 shows the LOC cost which are not relievable for tax purposes, and Chart 21 shows the total LOC cost.

Chart 19

Potential Real LOC Relievable Costs

£m (2006)

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 20

Potential Real LOC Unrelievable Costs

£m (2006)

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 21

Potential Real Total LOC Costs
LOC : all fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Cumulative 2006-2035 (£m Real 2006)								
$40/bbl 36p/therm	Sanctioned	Incremental	Future Incremental	Probable Fields	Possible Fields	Technical Reserves	New Exploration	Total
LOC Relievable	1884	84	147	11	8	228	201	2563
LOC Unrelievable	5967	267	464	35	26	721	635	8116
Real Total Loc Costs	7851	352	611	46	34	949	836	10679

Chart 22 shows the associated decommissioning costs which may cumulate to £15214m in the period to 2035.

Chart 22

Potential Real Decommissioning Costs

LOC : all fields

$40/bbl and 36p/therm

£m (2006)
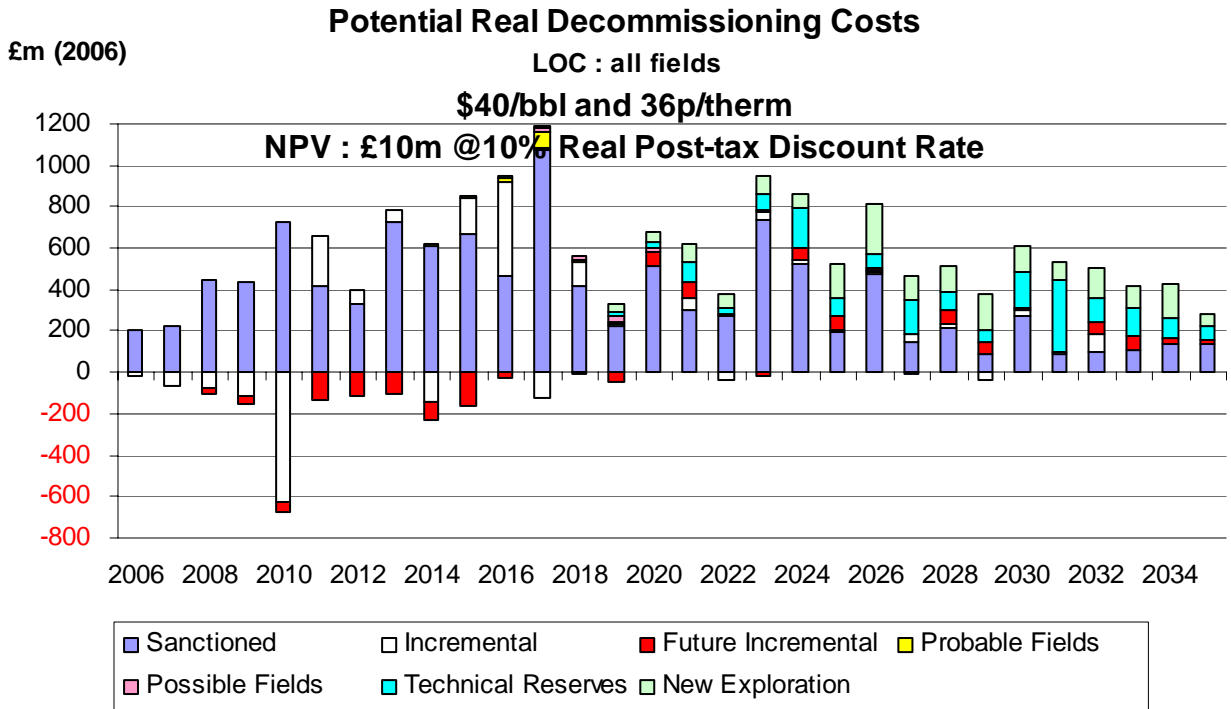
Chart 23 shows the potential decommissioning relief under the high price which may cumulate, with the LOC relief, to £10173m in the period to 2035.

Chart 23

Potential Real Decommissioning Relief (including LOC relief)

LOC : all fields

$40/bbl and 36p/therm

£m (2006)
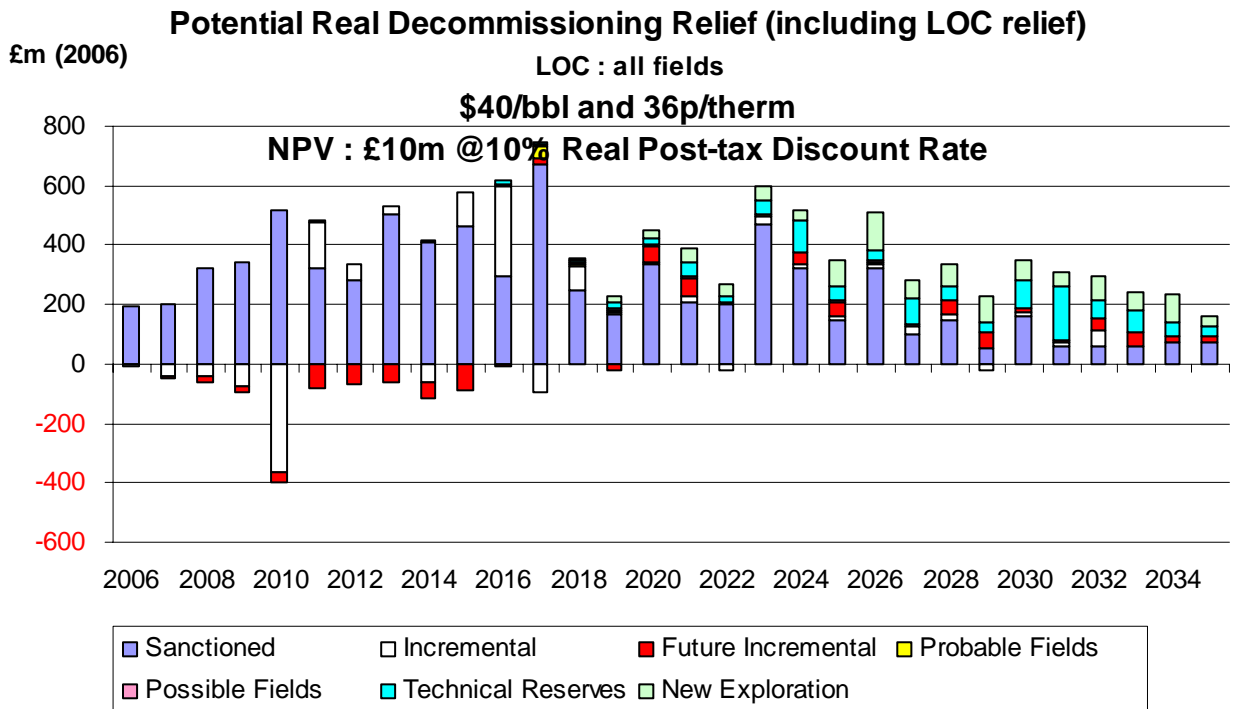
Chart 24 shows the relief given for LOC costs under the high price. This may cumulate to £1635m in the period to 2035.

Chart 24

Potential Real LOC Relief

£m (2006)

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
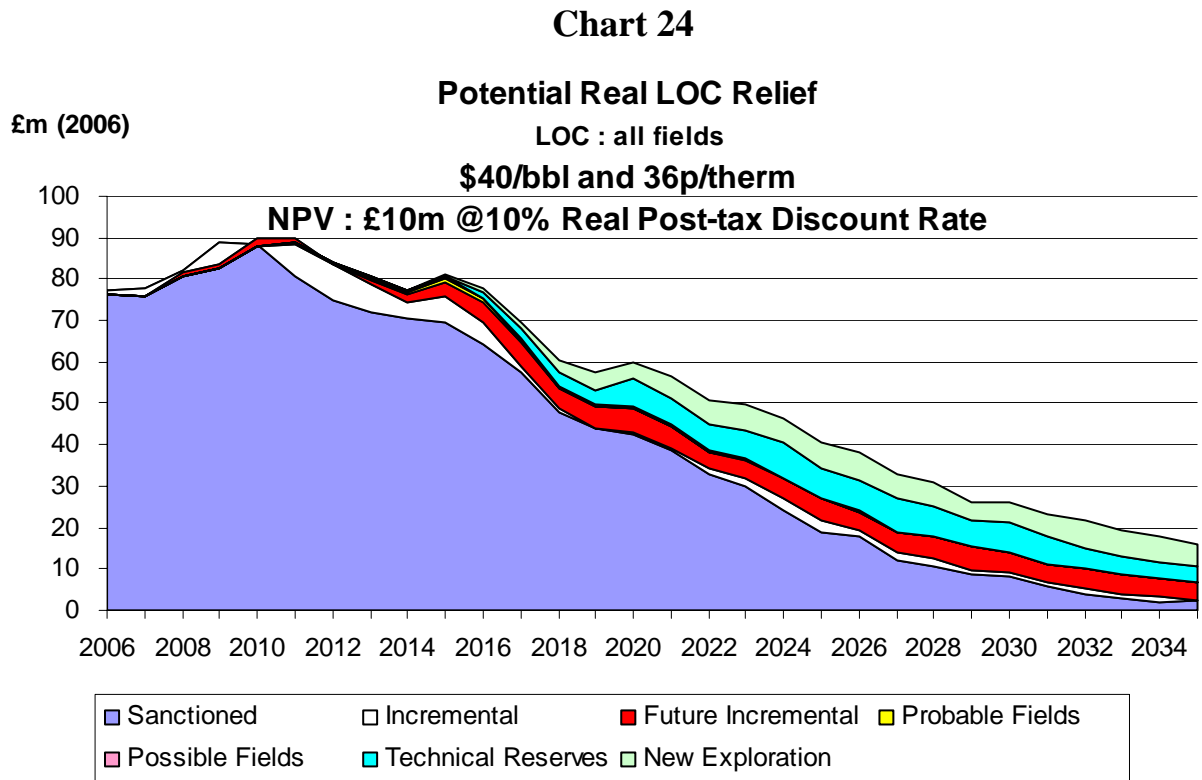
Chart 25 shows the total LOC cost minus LOC tax relief under the high price. This may cumulate to £9044m in the period to 2035.

Chart 25

Potential Real Total LOC Costs minus LOC Relief

£m (2006)

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
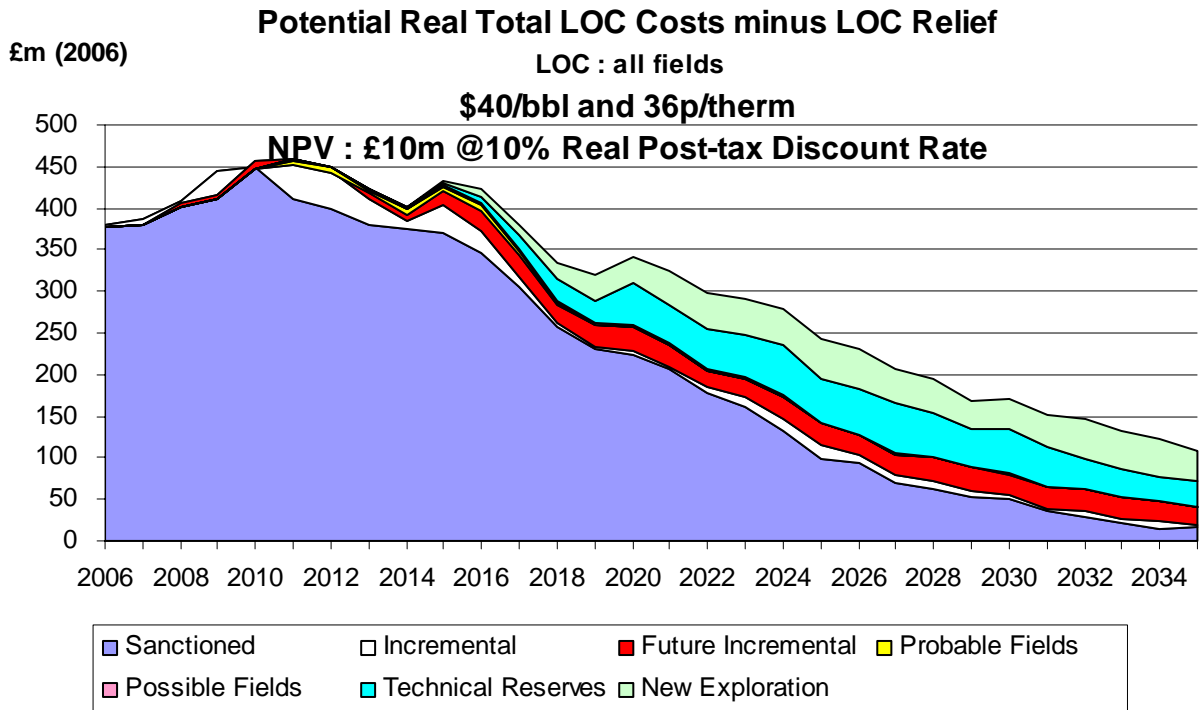
Chart 26 shows the change in operating costs which may occur under the high price with an LOC scheme (including the LOC costs and behavioural changes). This may cumulate to £7775m in the period to 2035.

Chart 26

Potential Change in Real Operating Expenditure (includes LOC costs)

£m (2006)

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
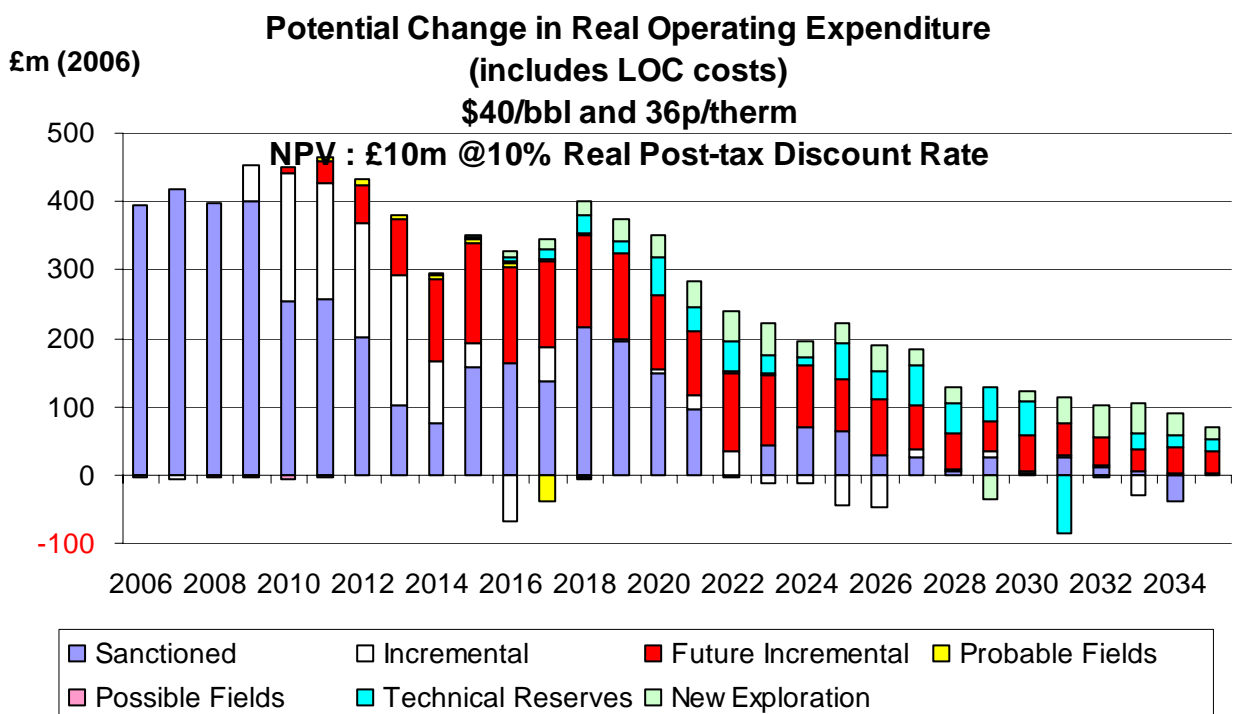
Chart 27 shows the potential change in operating costs alone (excluding LOC costs) with the introduction of the LOC scheme under the high price. Cumulatively to 2035, £2904m in operating expenditure may be foregone with the introduction of the LOC scheme.

Chart 27

Potential Change in Real Operating Expenditure

£m (2006)

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
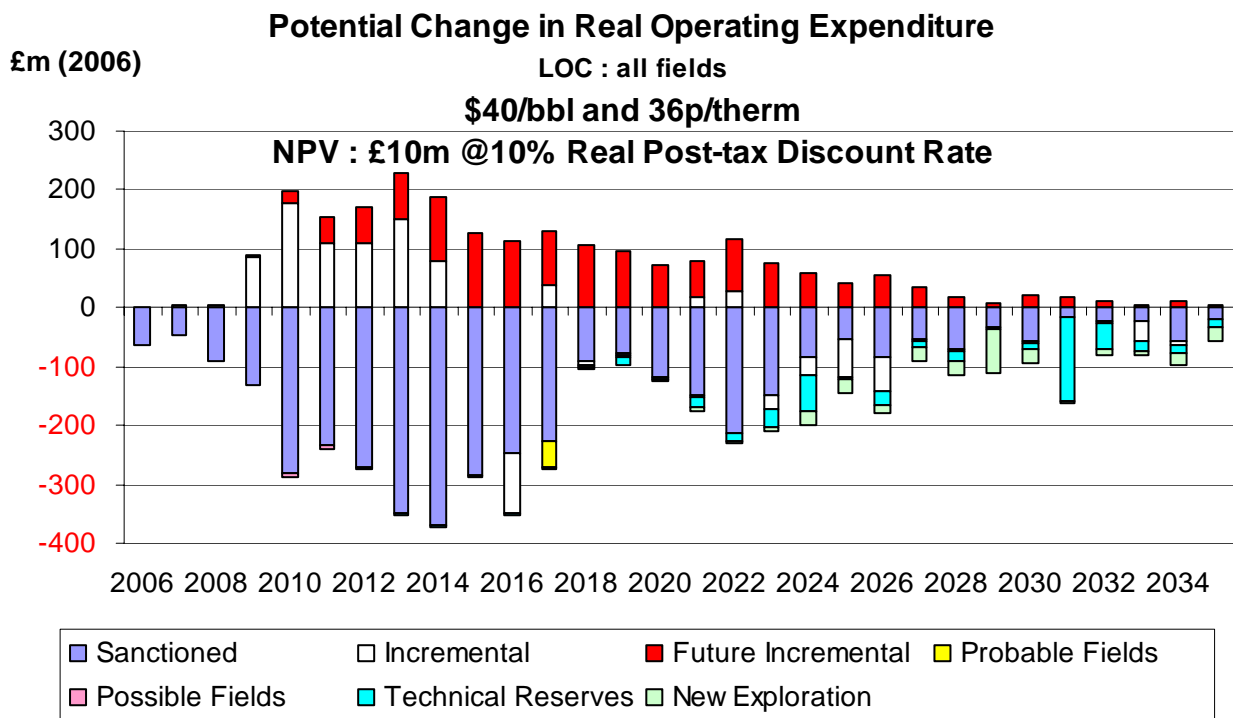
Chart 28 shows the corresponding potential production which may be foregone. This could cumulate to 119Mboe.

Chart 28

Potential Change in Production

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

mboe/d
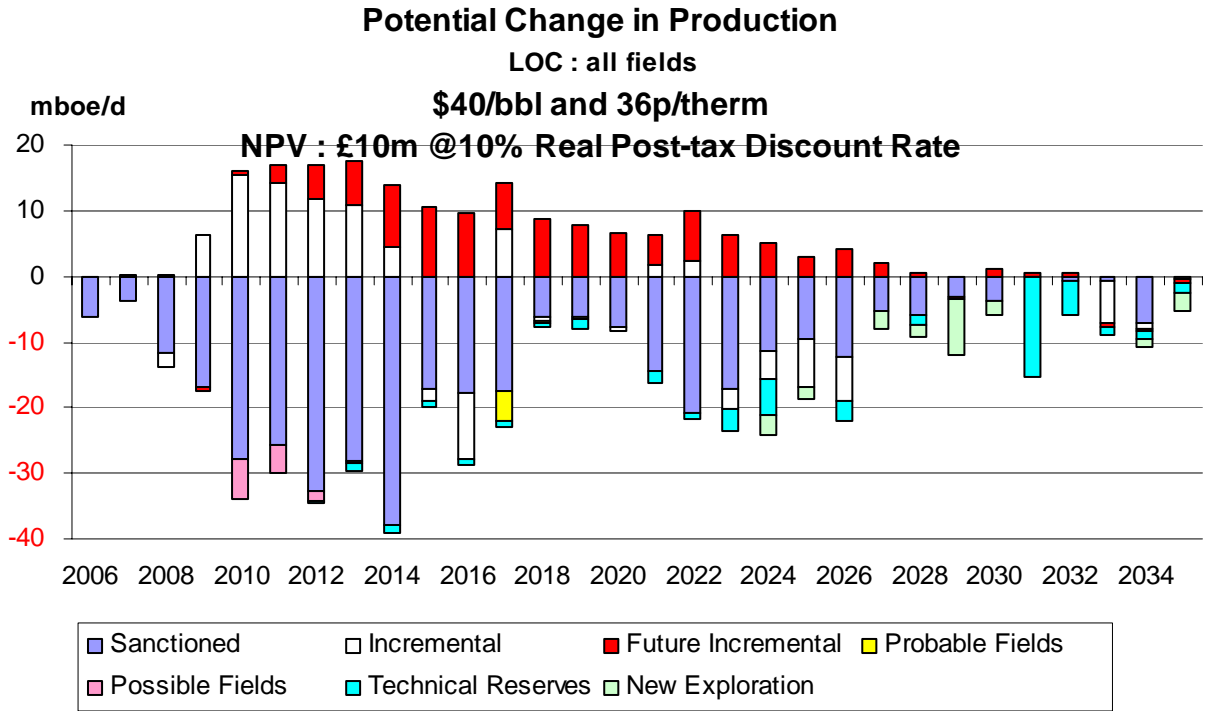
Chart 29 shows the corresponding development expenditure foregone. It may cumulate to £186m by 2035.

Chart 29

Potential Change in Real Development Expenditure

LOC : all fields

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)
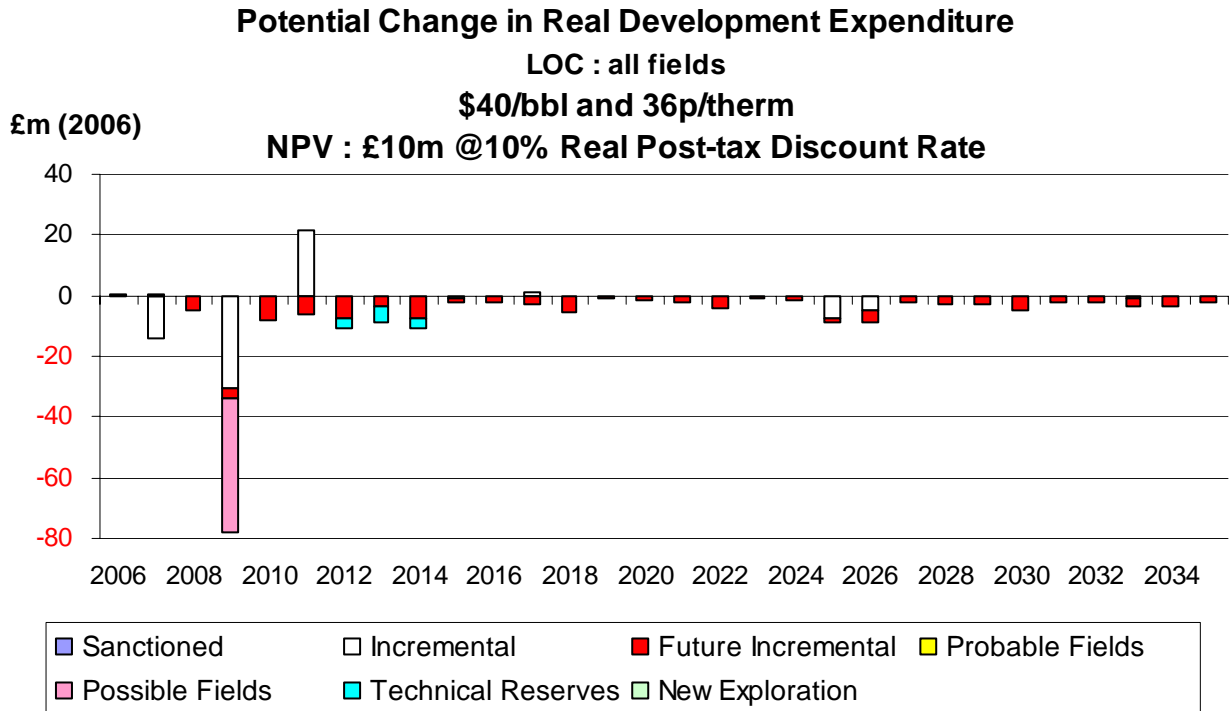
There is much less investment and production lost from the failure of projects to pass the investment hurdle under the $40, 36 pence case because there are far fewer marginal projects.

Chart 30 shows the change in tax revenues following the introduction of the LOC scheme. This may cumulate to a reduction in tax revenues of £1830m in the period to 2035. With LOC relief the cumulative total reduction in tax revenue is £3466m.

Chart 30

Potential Change in Real Tax Revenue
Without LOC Relief
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
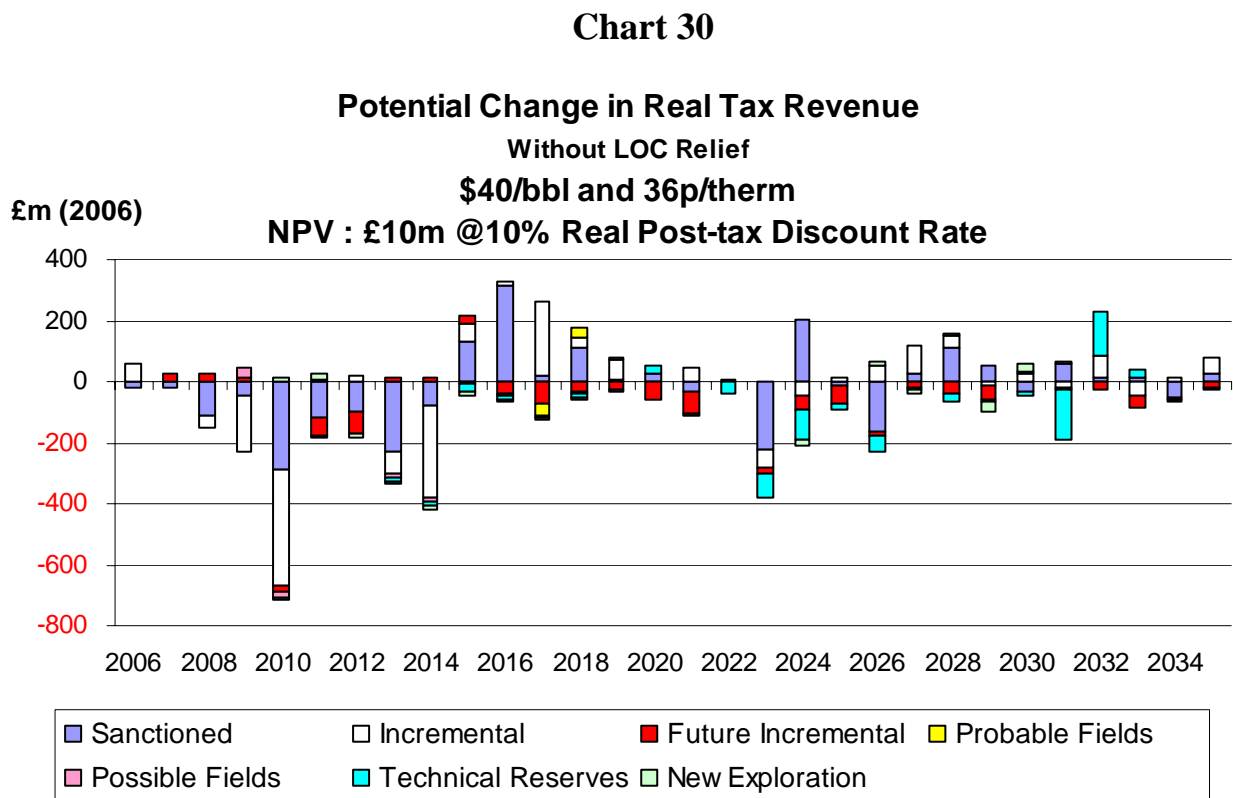
c)   Surety Bond

It is assumed that the Bond, like the LOC, is instituted when remaining NPV (RNPV) falls to 150% of the gross decommissioning costs and that the Bond continues until field decommissioning. It is also assumed that the annual cost is 3.5% based on gross decommissioning cost (MOD)

minus the annual net cash flows from production. The cost is tax deductible. The scheme starts in 2006. The modelling also reflects behavioural changes namely (a) acceleration of decommissioning to avoid negative cash flows and (b) investment in very marginal projects may be deterred because of the Bond costs.

Chart 31 shows the Bond costs under the medium price. They may cumulate to £5748m in the period to 2035.

Chart 31

Potential Real Bond Costs (Relievable)
Bond : all Fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
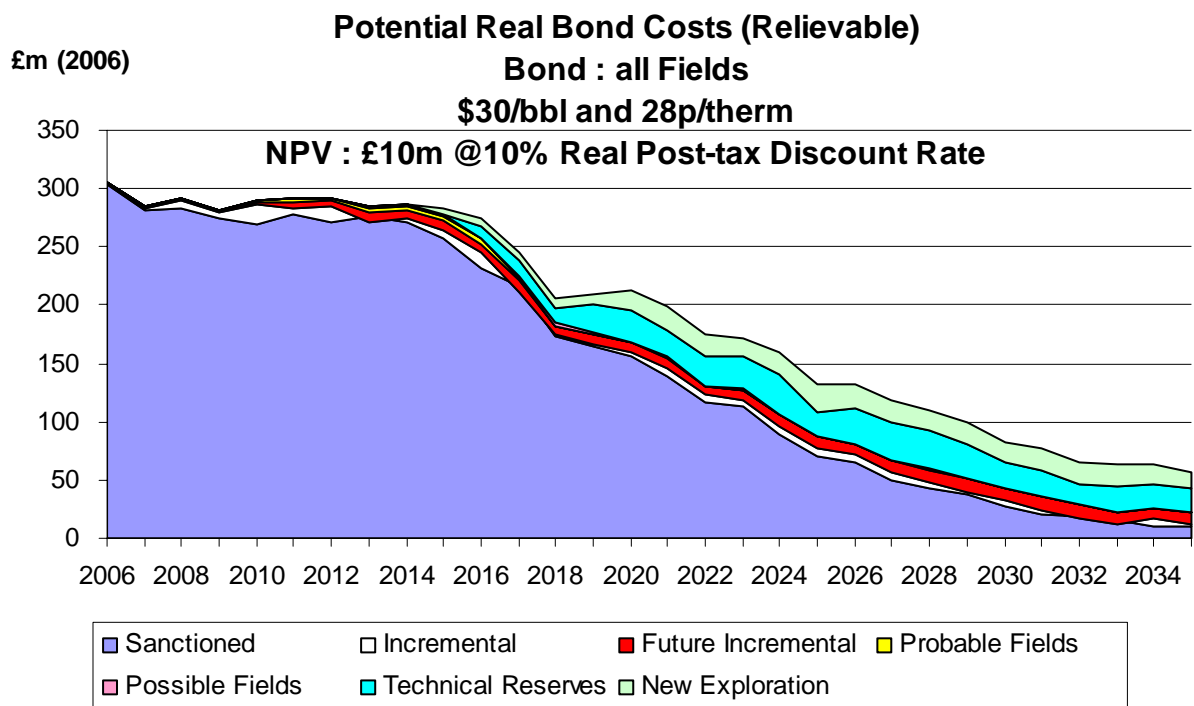
Chart 32 shows the associated decommissioning costs which may cumulate to £14242m in the period to 2035.

Chart 32

Potential Real Decommissioning Costs
Bond :all Fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

■ Sanctioned	□ Incremental	■ Future Incremental	□ Probable Fields
■ Possible Fields	■ Technical Reserves	□ New Exploration	
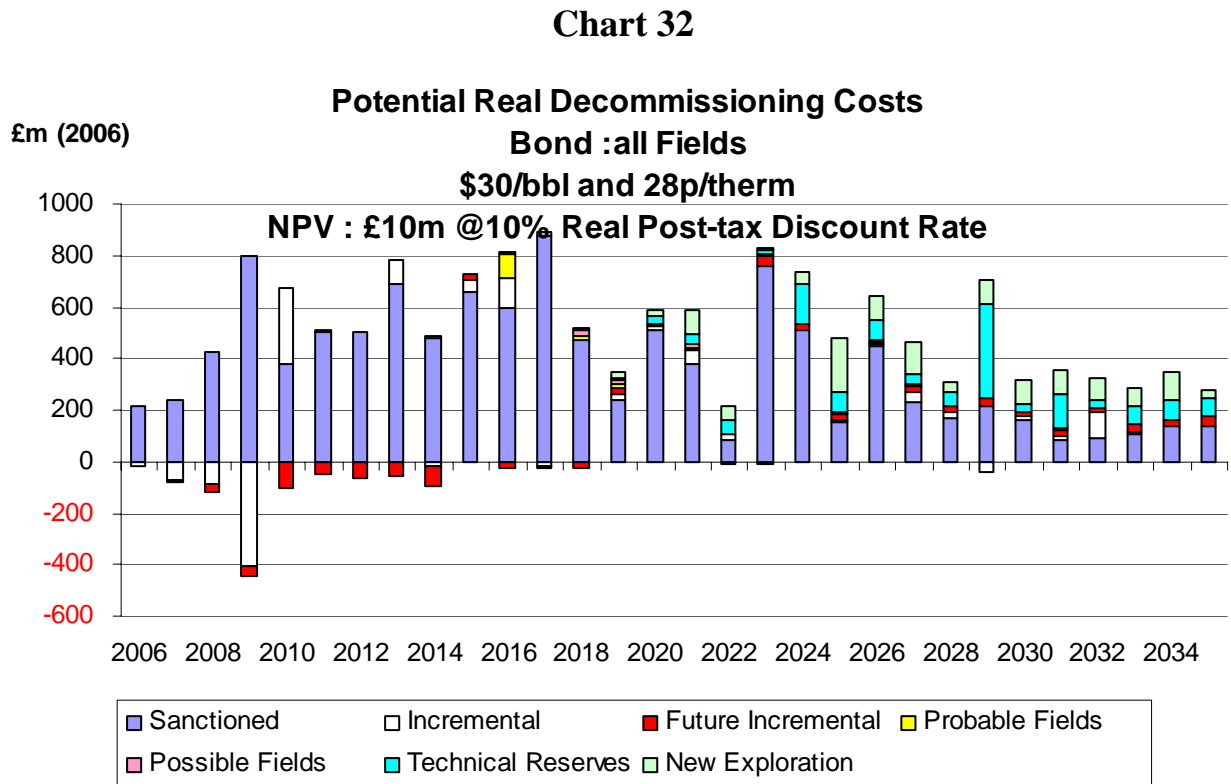
Chart 33 shows the potential decommissioning relief under the medium price which may cumulate, with the Bond relief, to £11640m in the period to 2035.

Chart 33

Potential Real Decommissioning Relief (including Bond Relief)
Bond :all Fields
$30/bbl and 28p/therm

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
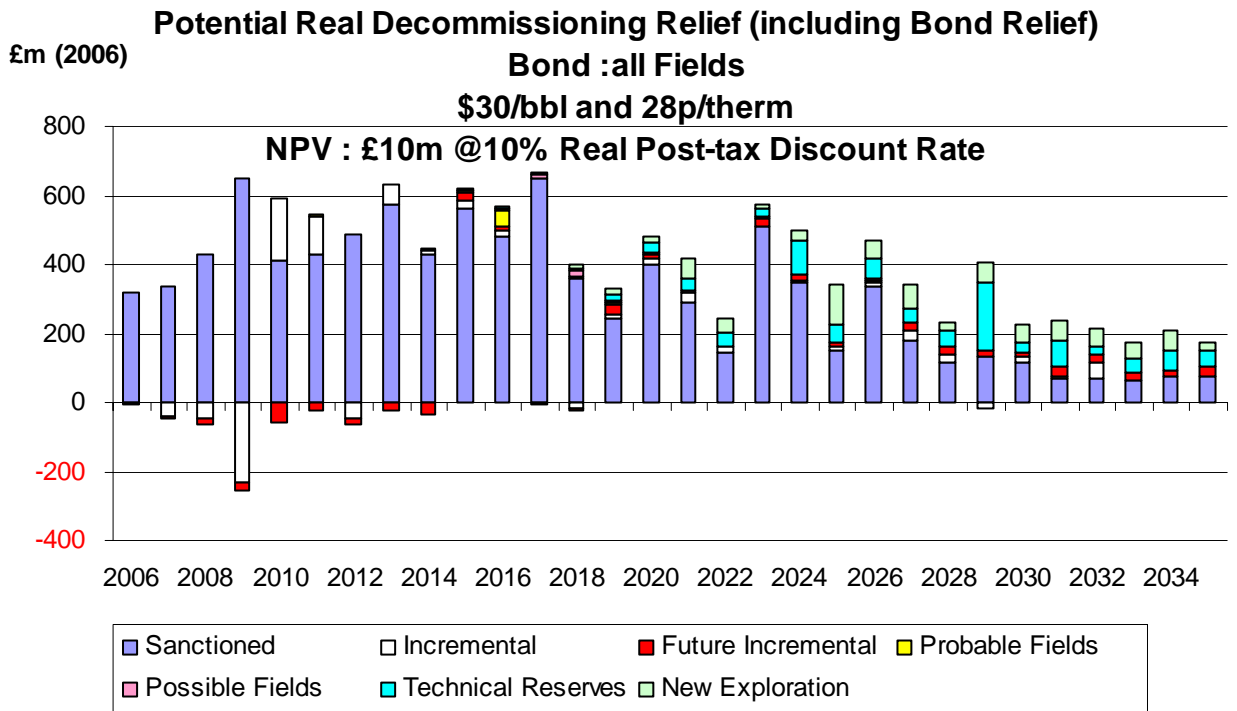
Chart 34 shows the relief given for Bond costs under the medium price. It cumulates to £3675m in the period to 2035.

Chart 34

Potential Real Bond Relief
Bond :all Fields
$30/bbl and 28p/therm

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
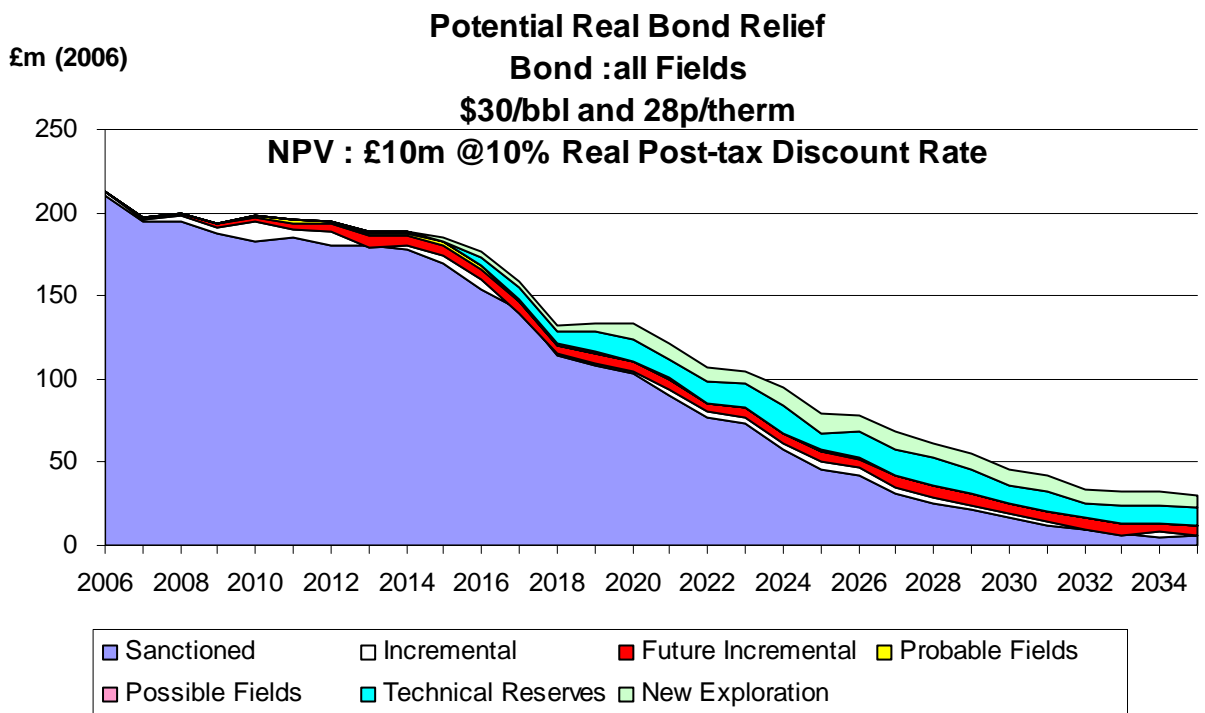
Chart 35 shows the total Bond cost minus Bond tax relief under the medium price. This cumulates to £2073m in the period to 2035.

Chart 35

**Potential Real Bond Costs minus Bond relief
Bond :all Fields
$30/bbl and 28p/therm**

£m (2006)

NPV -£10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
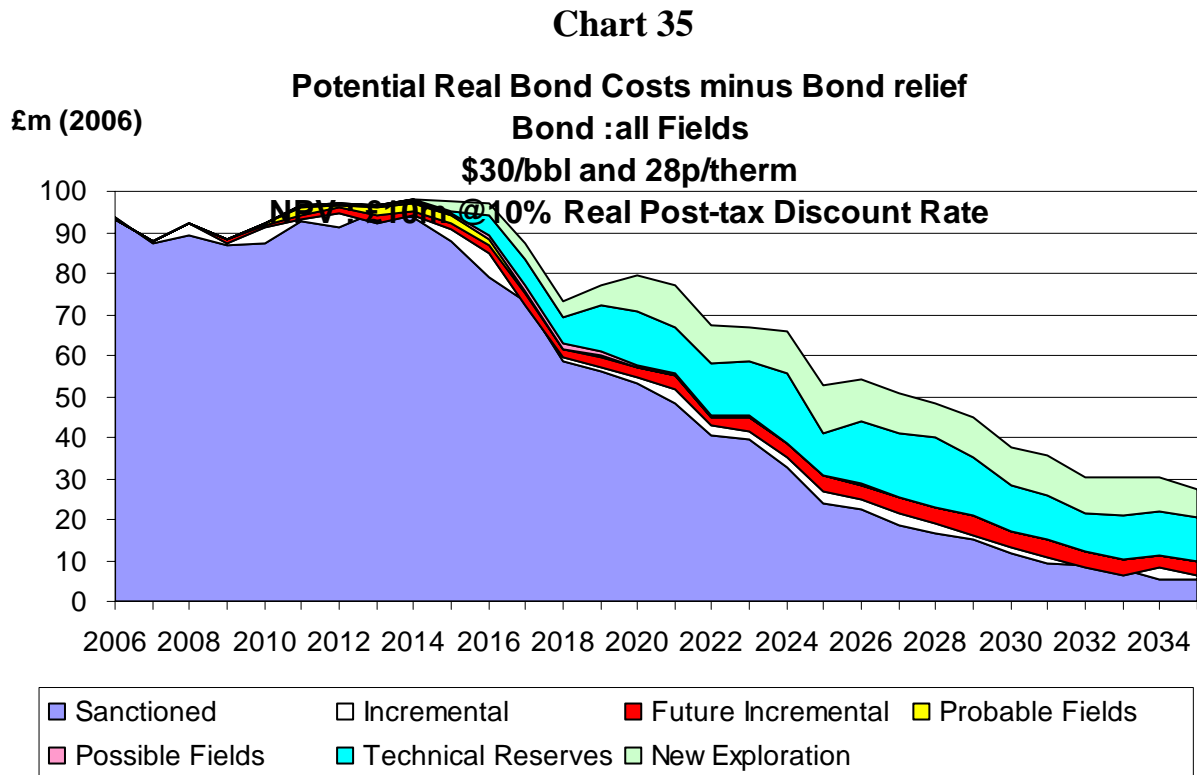
Chart 36 shows the change in operating costs which may occur once all fields are involved in a Bond scheme.   The effect includes the behavioural changes of the investor and the Bond costs.   They may cumulate to £2543m in the period to 2035.

Chart 36

**Potential Change in Real Operating Expenditure
(includes Bond costs)
$30/bbl and 28p/therm**

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
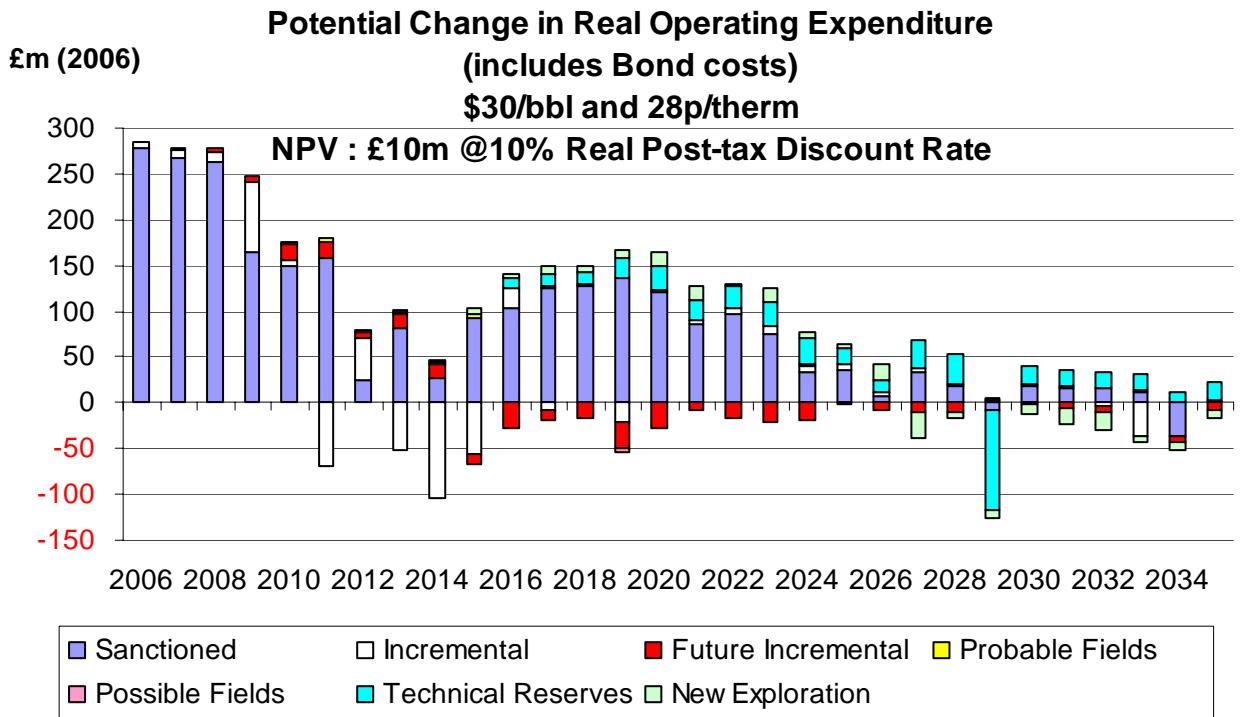
Chart 37 shows the potential change in operating costs alone (i.e. the behavioural effects). Cumulatively to 2035, £3205m in operating expenditure may be foregone with the introduction of the Bond scheme.

Chart 37

**Potential Change in Real Operating Expenditure
Bond : all Fields
$30/bbl and 28p/therm**

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
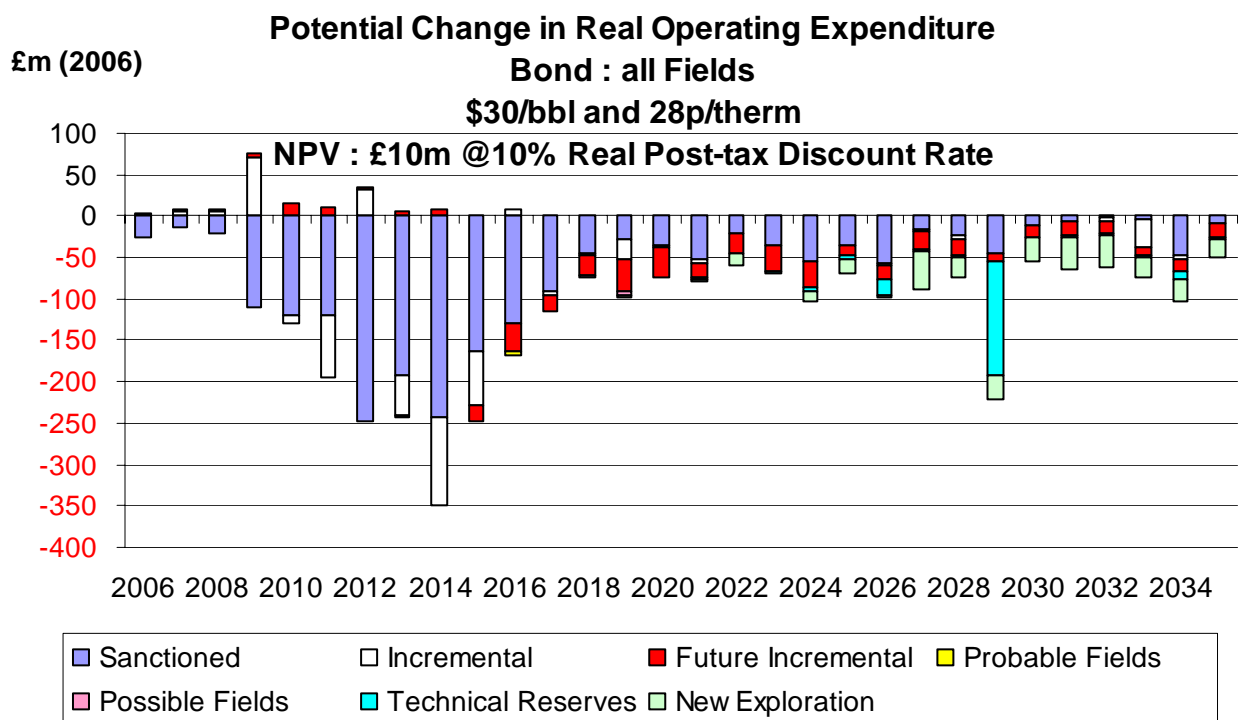
Chart 38 shows the corresponding potential production which may be foregone. This could cumulate to 229Mboe.

Chart 38

Potential Change in Production
Bond : all Fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
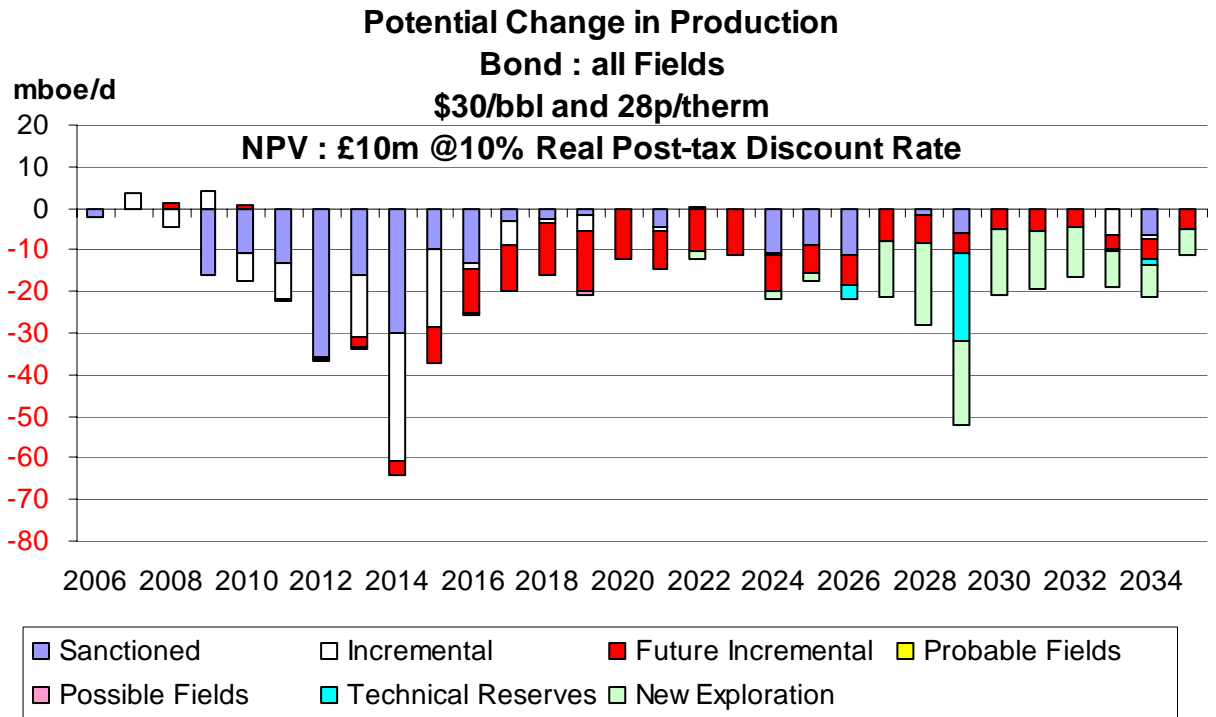
Chart 39 shows the corresponding development expenditure foregone. It may cumulate to £471m.

Chart 39

**Potential Change in Real Development Expenditure
Bond : all Fields
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate**

£m (2006)
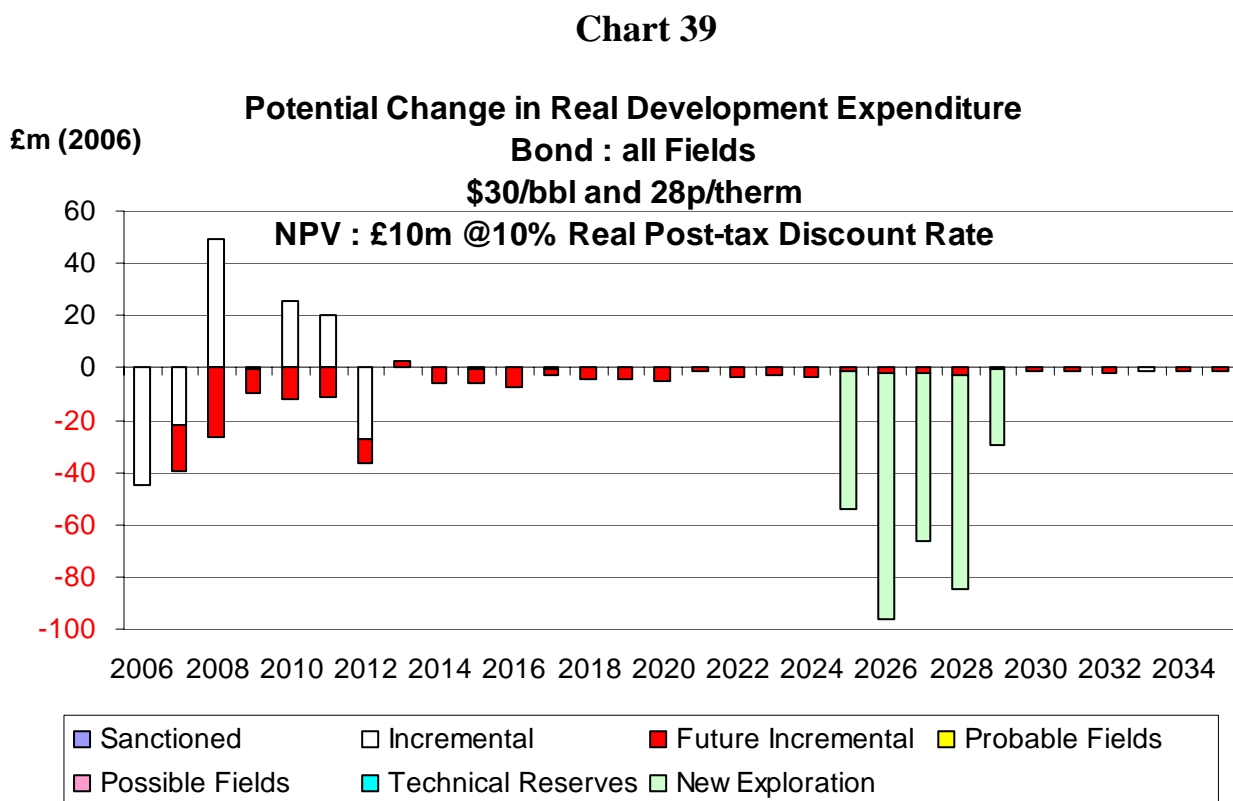
The reductions in investment and operating expenditure and in production in the later part of the period are primarily due to the failure of projects to pass the economic hurdle following the introduction of the Bond.

Chart 40 shows the change in tax revenue which would be expected with the introduction of the Bond scheme from the changes in the development and decommissioning dates. This may cumulate to a reduction in tax revenues of £2706m in the period to 2035. Including Bond relief the cumulative total reduction in tax revenue is £6381m.

Chart 40

**Potential Change in Real Tax Revenue
Without Bond relief
$30/bbl and 28p/therm**

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental □ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration
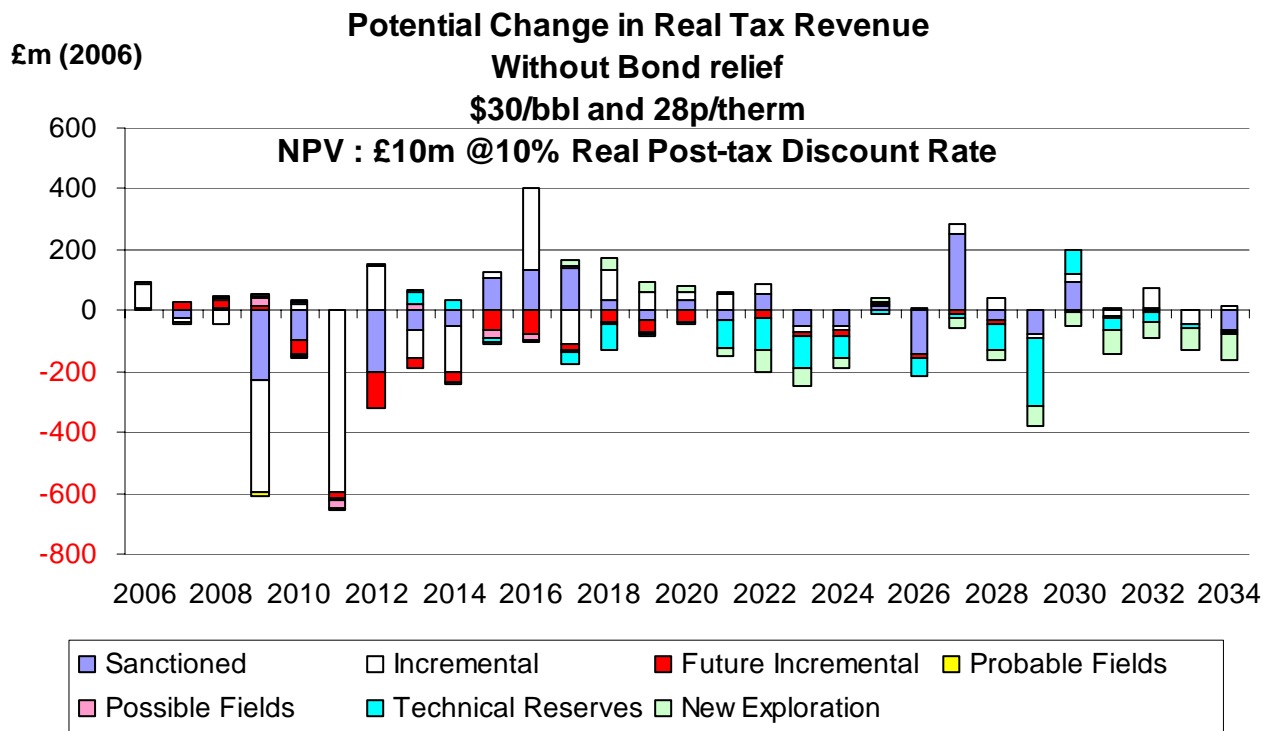
The results under the $40, 36 pence case are now shown.

Chart 41 shows the Bond costs. They may cumulate to £6092m in the period to 2035.

Chart 41

Potential Real Bond Costs (Relievable)
Bond :all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

| ■ Sanctioned | □ Incremental | ■ Future Incremental | □ Probable Fields |
| ■ Possible Fields | ■ Technical Reserves | □ New Exploration | |
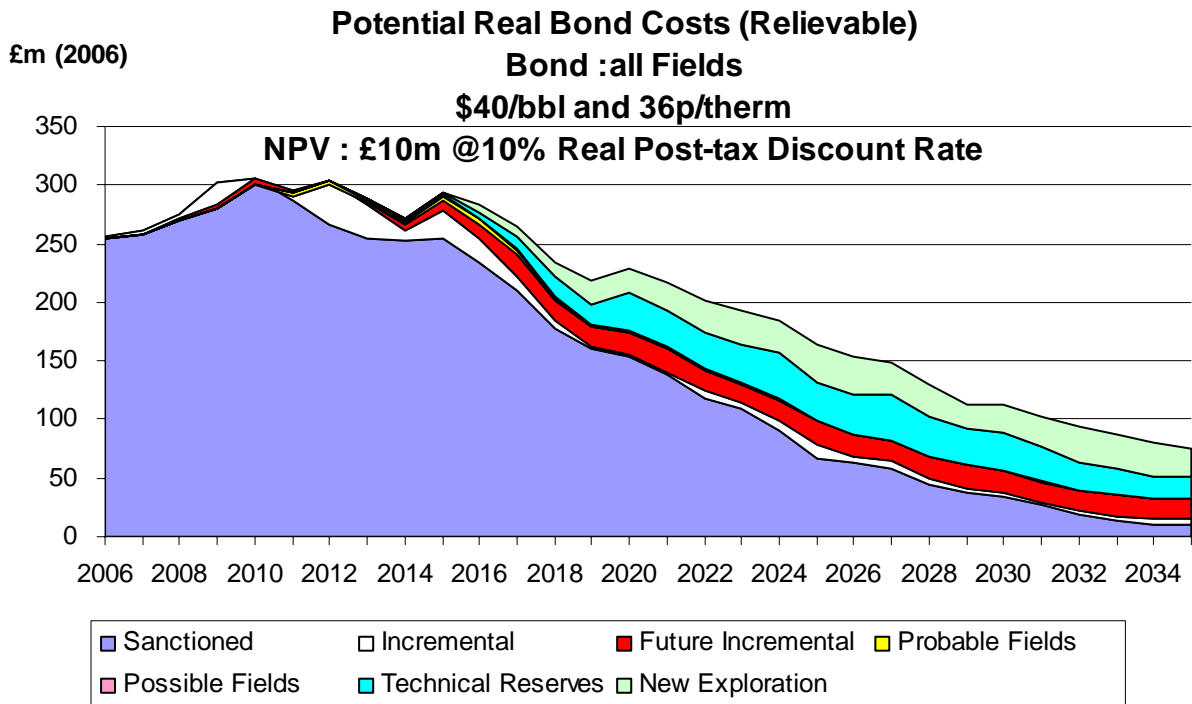
Chart 42 shows the associated decommissioning costs which may cumulate to £15079m in the period to 2035.

Chart 42

Potential Real Decommissioning Costs
Bond :all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

| ■ Sanctioned | □ Incremental | ■ Future Incremental | □ Probable Fields |
| ■ Possible Fields | ■ Technical Reserves | □ New Exploration | |
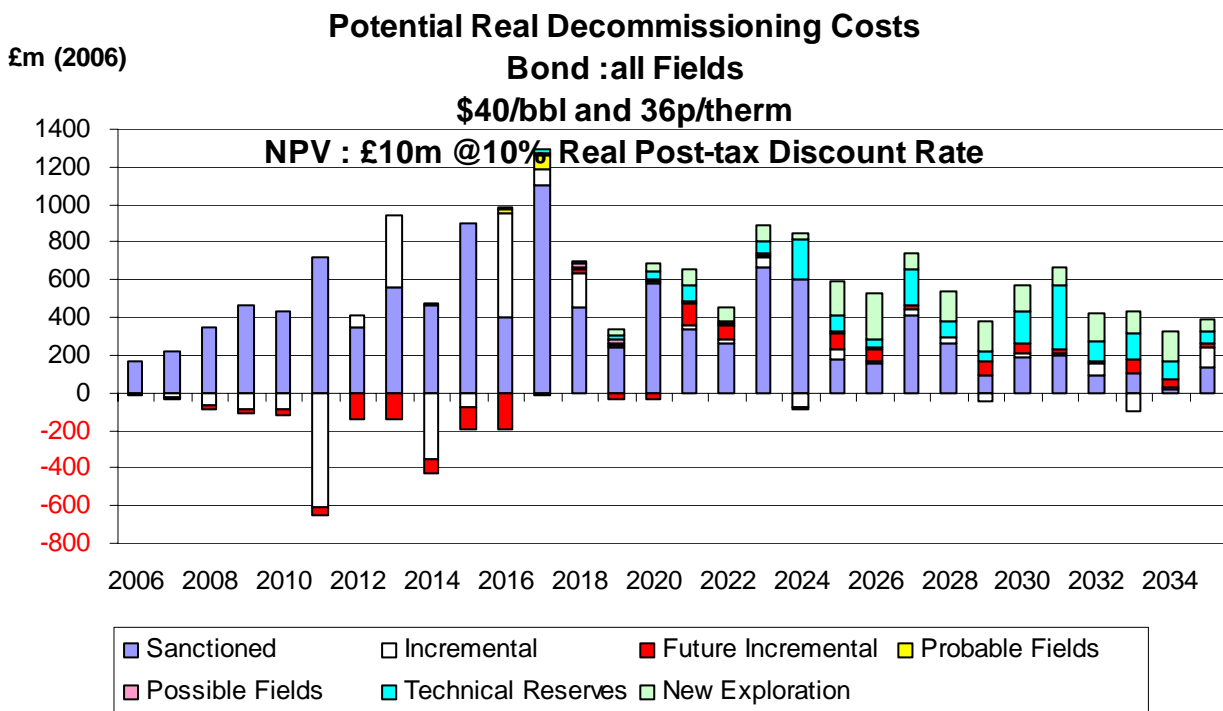
Chart 43 shows the potential decommissioning relief under the high price which may cumulate, with the Bond relief, to £12354m in the period to 2035.

Chart 43

Potential Real Decommissioning Relief (including Bond Relief)
Bond :all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
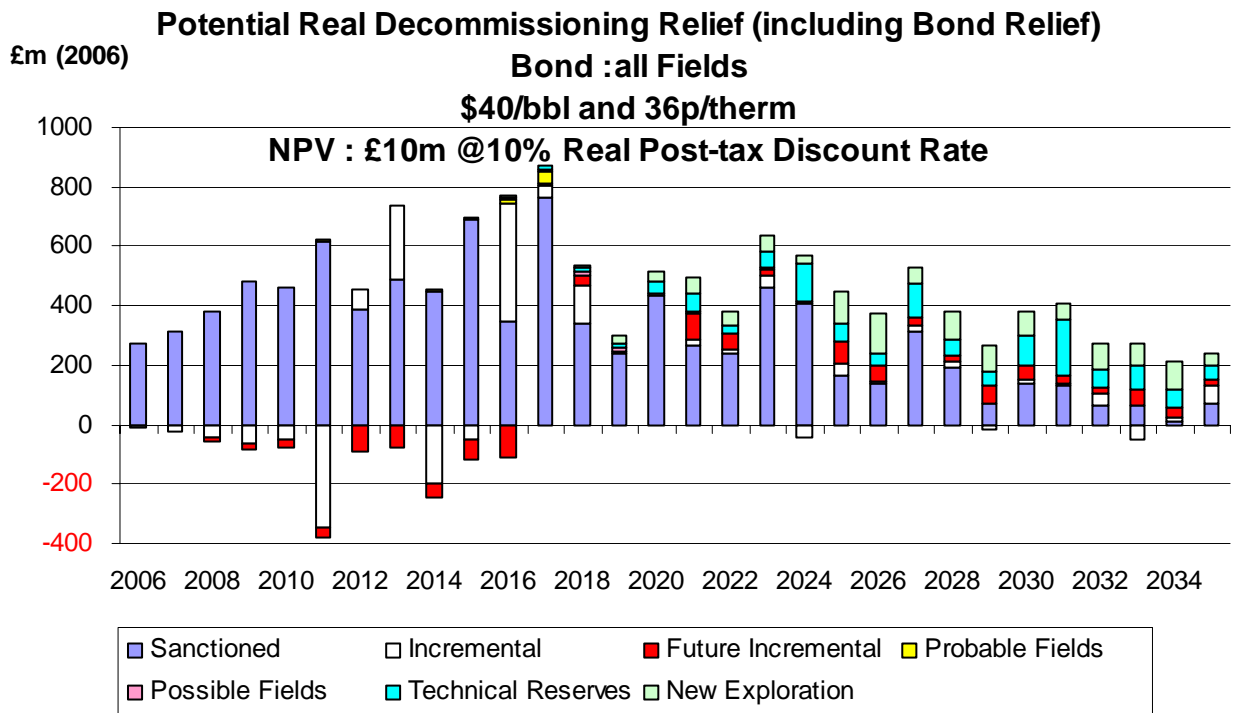
Chart 44 shows the relief given for Bond costs. It may cumulate to £3886m in the period to 2035.

Chart 44

Potential Real Bond Relief
Bond :all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

| ■ Sanctioned | □ Incremental | ■ Future Incremental | □ Probable Fields |
| ■ Possible Fields | ■ Technical Reserves | ■ New Exploration | |
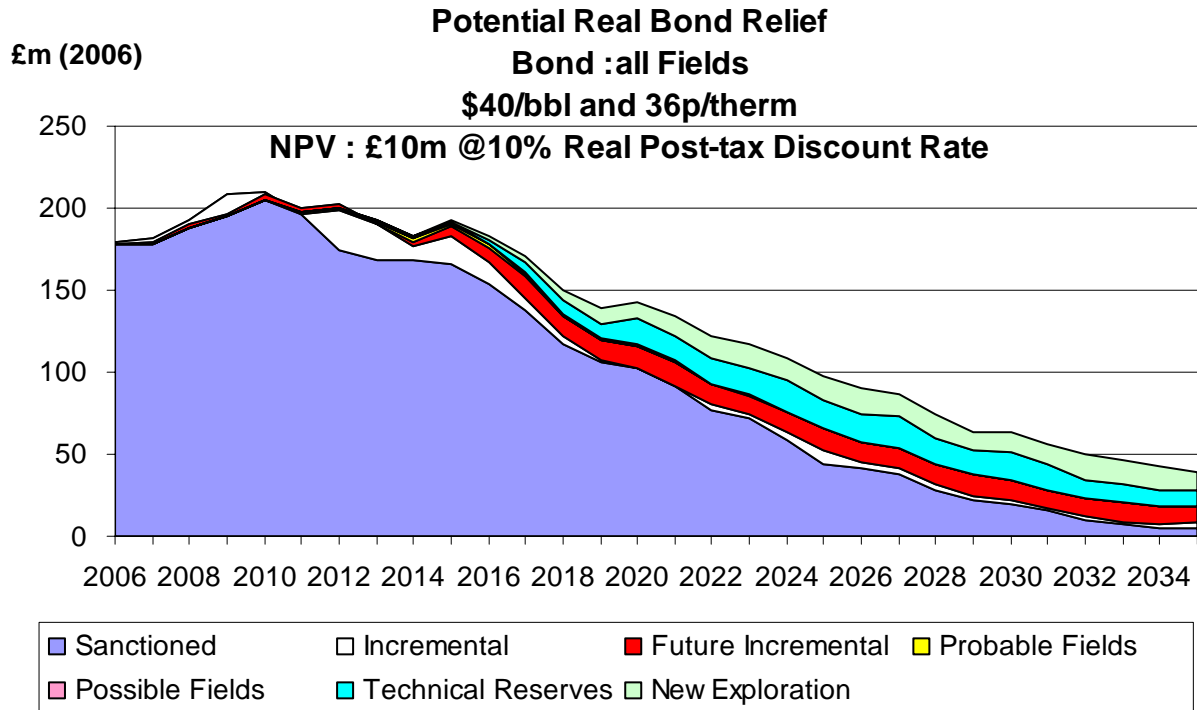
Chart 45 shows the total Bond cost minus Bond tax relief under the high price. This may cumulate to £2205m in the period to 2035.

Chart 45

Potential Real Bond Costs minus Bond relief
Bond :all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

| ■ Sanctioned | □ Incremental | ■ Future Incremental | □ Probable Fields |
| ■ Possible Fields | ■ Technical Reserves | ■ New Exploration | |
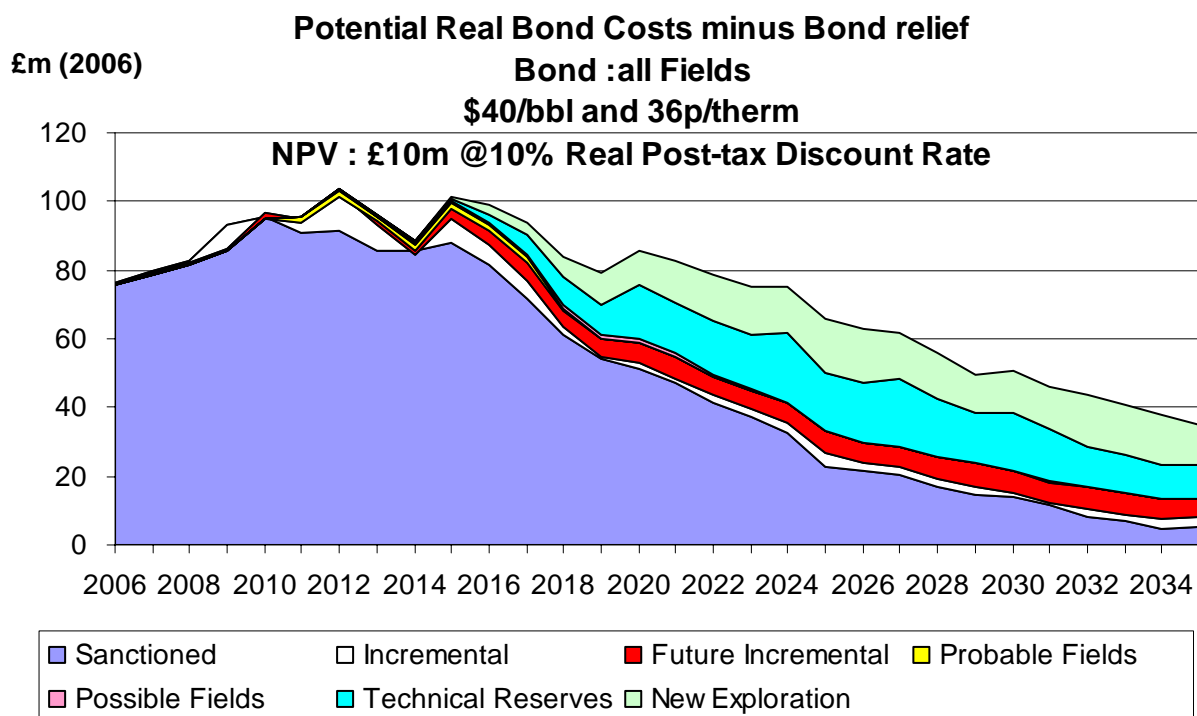
Chart 46 shows the change in operating costs including Bond costs and behavioural changes. The total may cumulate to £5015m in the period to 2035.

Chart 46

Potential Change in Real Operating Expenditure (includes Bond costs) $40/bbl and 36p/therm
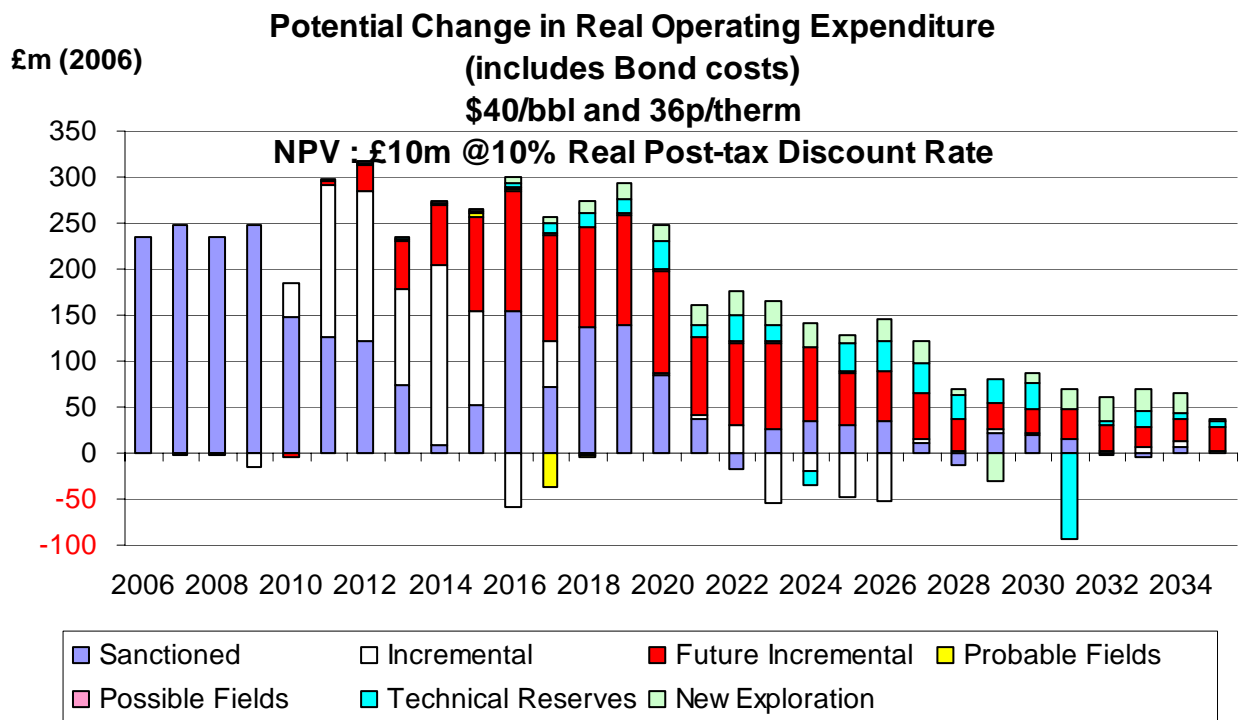
Chart 47 shows the potential change in operating costs alone (i.e. the behavioural changes of the investor). They cumulate to £1077m.

Chart 47

Potential Change in Real Operating Expenditure
Bond : all Fields
$40/bbl and 36p/therm

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
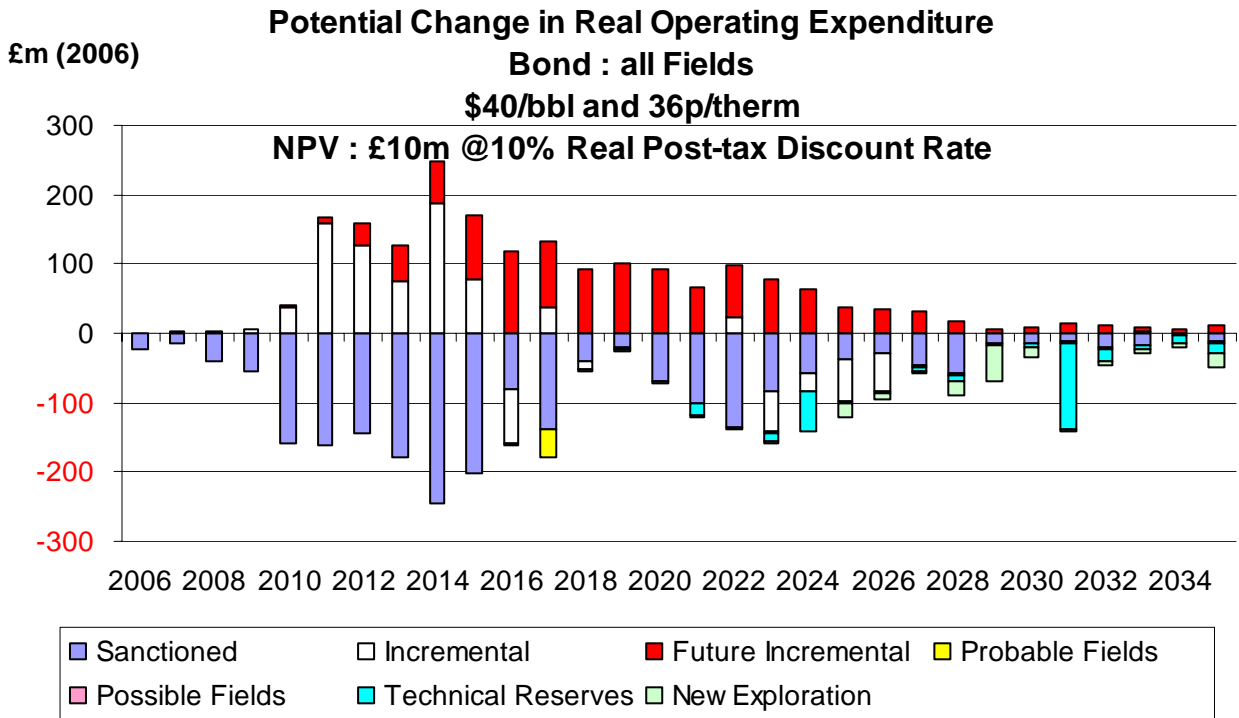
Chart 48 shows the corresponding potential production which may be foregone. This could cumulate to 23Mboe.

Chart 48

Potential Change in Production
Bond : all Fields
$40/bbl and 36p/therm

mboe/d

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
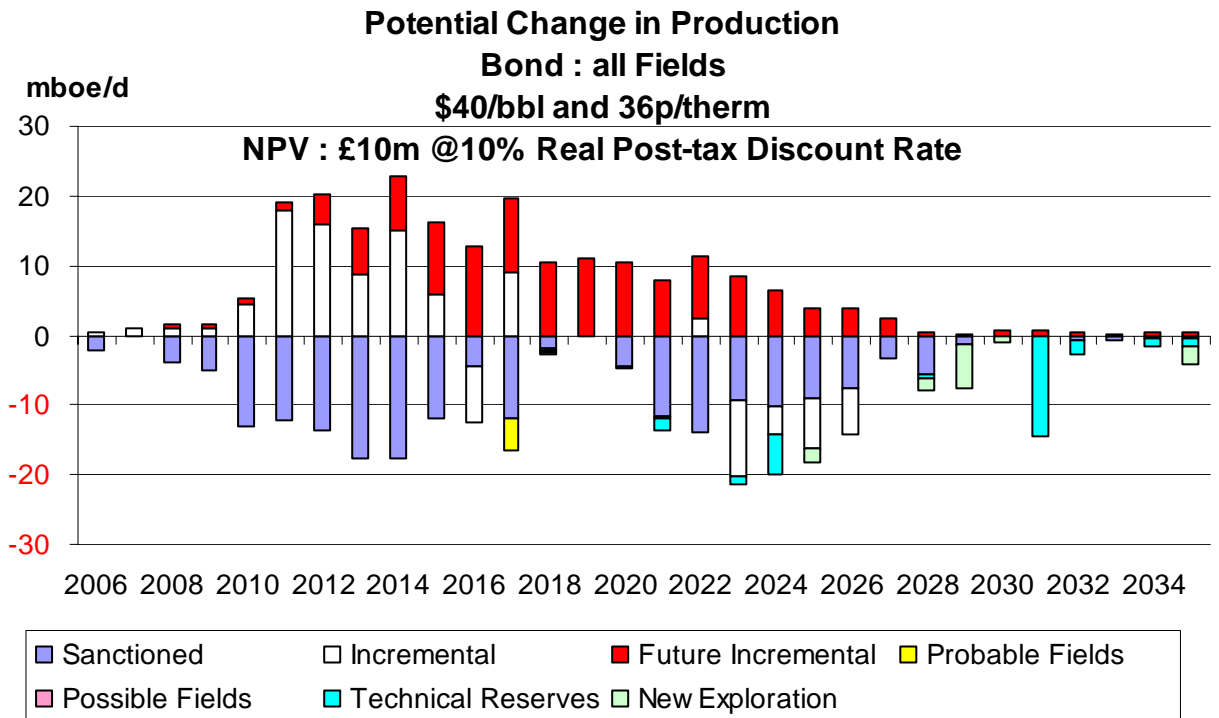
Chart 49 shows the corresponding development expenditure foregone. It may cumulate to £138m.

Chart 49

**Potential Change in Real Development Expenditure
Bond : all Fields
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate**

£m (2006)

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration
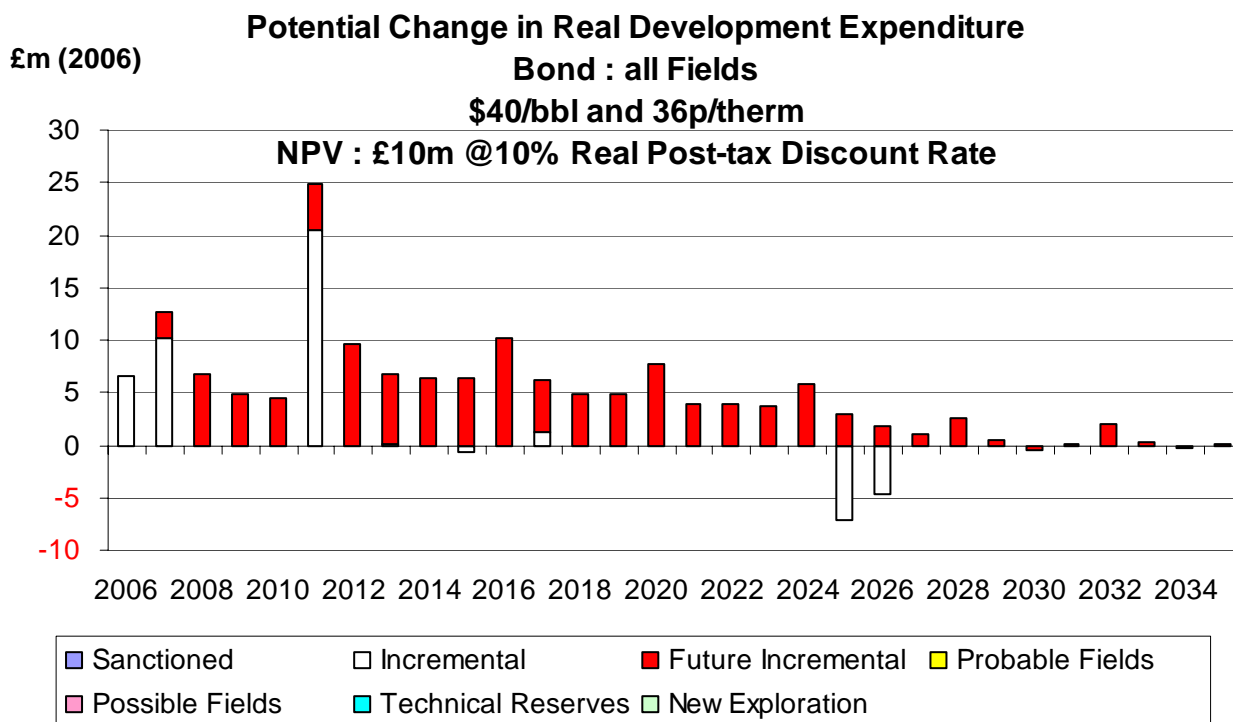
The introduction of the Surety Bond has only a modest negative effect on the investment in and production from new projects. Few are rendered unviable by the Bond.

Chart 50 shows the change in tax revenues which would be expected with the introduction of the Bond scheme from the changes in the development and decommissioning dates. This may cumulate to a reduction in tax revenues of £1003m by 2035. With Bond relief the cumulative total reduction in tax revenues is £4889m.

Chart 50

**Potential Change in Real Tax Revenue
Without Bond relief
$40/bbl and 36p/therm**

£m (2006)

NPV : £10m @10% Real Post-tax Discount Rate

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration
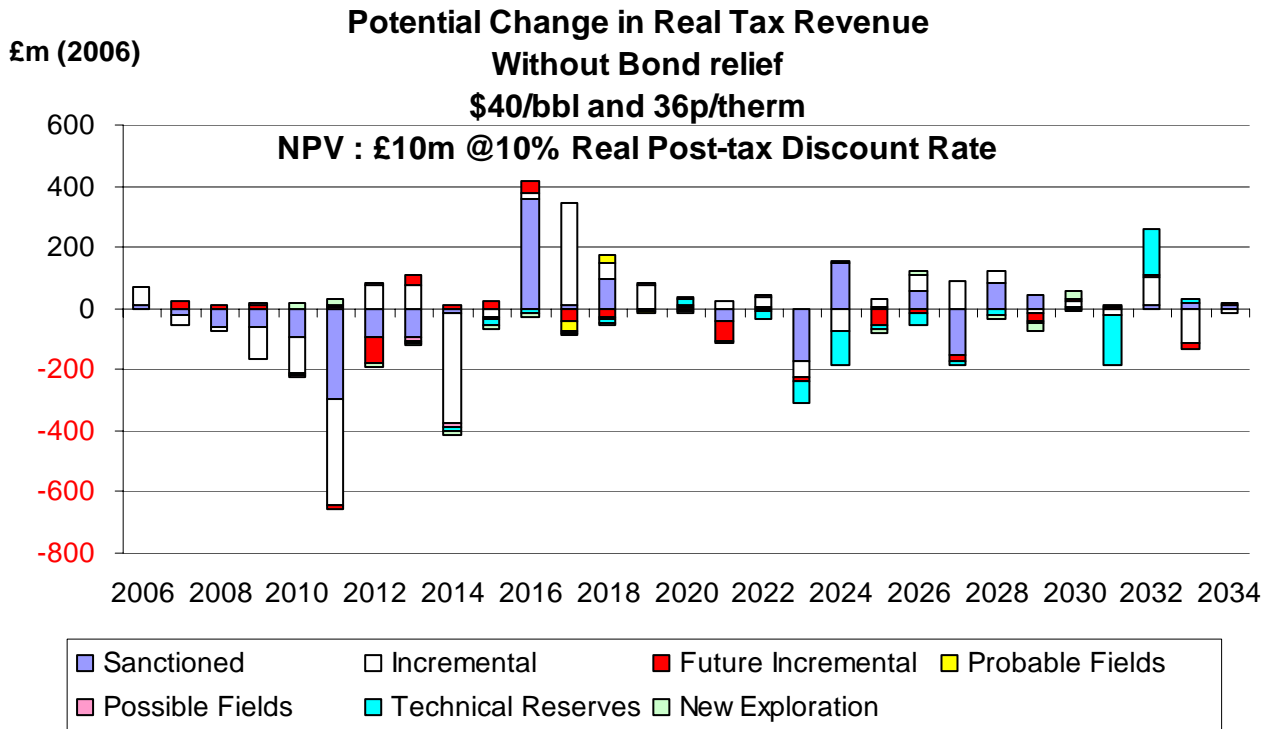
d)   Trust Funds

Trust Funds are conceptually different from LOCs and Bond schemes because while the costs of the latter involve extra costs contributions to a Fund are advance payments. Several variants of a Trust Fund were examined in detail involving different assumptions. These were felt necessary because of the range of possibilities which it was felt useful to highlight. There were some common assumptions namely that the scheme would commence in 2006 and that contributions would commence when RNPV reached 150% of gross decommissioning costs. The annual contributions follow the decline rate of field revenues. (This is in contrast to the situation with LOCs and Surety Bonds where the contributions increase as field revenues decrease). Inheritance Tax is not applied as this would clearly make the scheme unviable.

Fund 1

In this scheme tax relief is given for Fund contributions (CT, SCT and PRT). Monies paid into the Fund obtain a return of 4.75% which is taxed at 40%. It is assumed that there will be no change in investor behaviour.

Chart 51 shows the potential decommissioning costs with under the medium price. The decommissioning cost cumulates to £14014m in the period to 2035.

Chart 51

Potential Real Decommissioning Expenditure
Decommissioning Fund : with relief for Fund contributions, interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 52 shows the potential decommissioning relief under the medium price. It cumulates to £8801m in the period to 2035.

Chart 52

Potential Real Decommissioning Relief
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
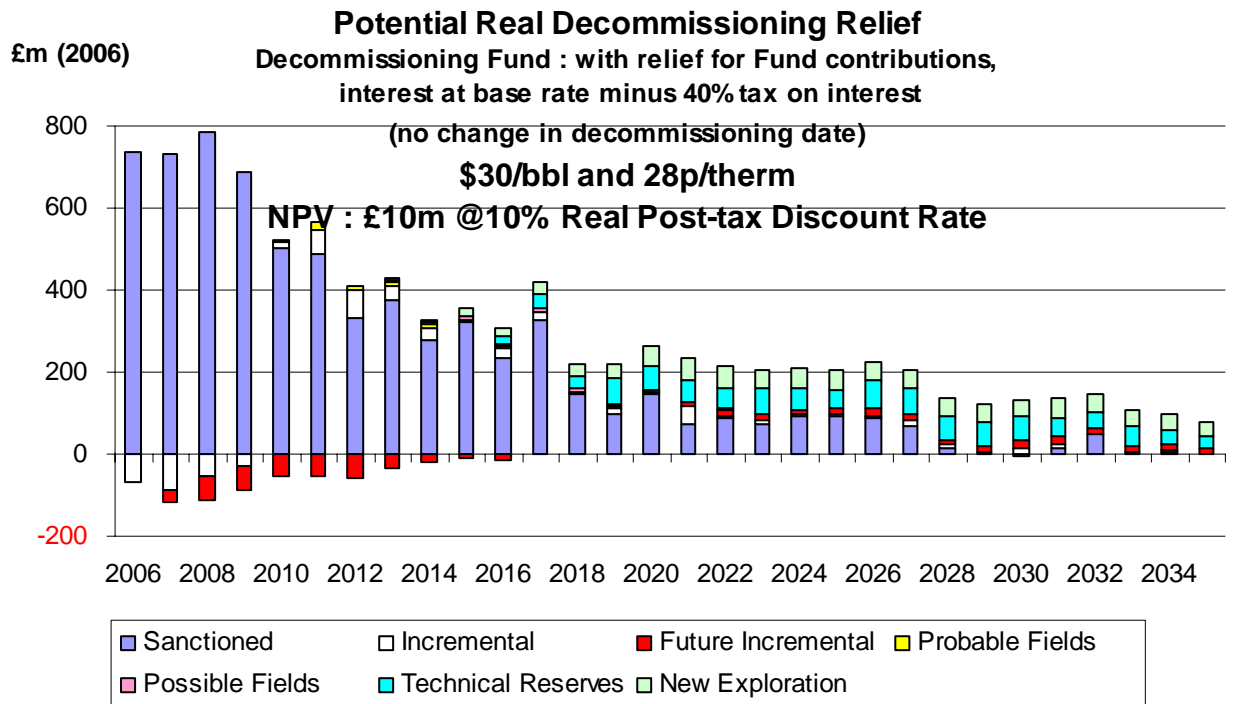
Chart 53 shows the tax on the Fund interest with the medium price when the Fund receives gross interest at 4.74%. It cumulates to £1522m in the period to 2035.

Chart 53

Potential Real Tax on Inerest

£m (2006)

Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

(no change in decommissioning date)

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
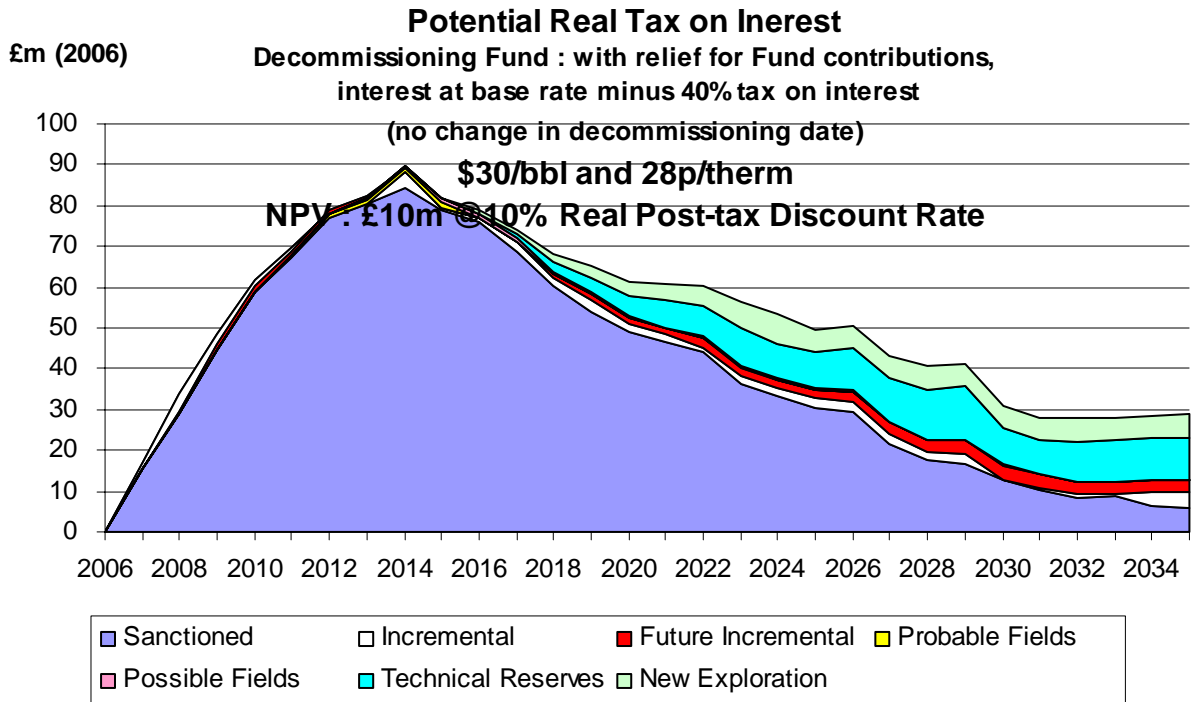
Chart 54 shows the real Fund payments paid by the operators under the medium price. They cumulate to £11269m in the period to 2035.

Chart 54

Potential Real Fund Payments

£m (2006)

Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

(no change in decommissioning date)

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration

Chart 55 shows the potential Fund shortfall for determining contributions using the formula. When this situation occurs it is assumed that tax relief will be given on the "shortfall expenditure" when it occurs. This cumulates to £3648m in the period to 2035.

The shortfalls come about for various reasons. Starting the scheme in 2006 with the application of the formula to all fields means that inadequate cash flows are available from fields whose decommissioning is imminent. In other cases in much later years there is often some capital investment in late field life after the formula has been triggered. The (lumpy) expenditure results in the cash flows in the years in question being reduced such that contributions are greatly curtailed. Subsequently there can be a catch-up in t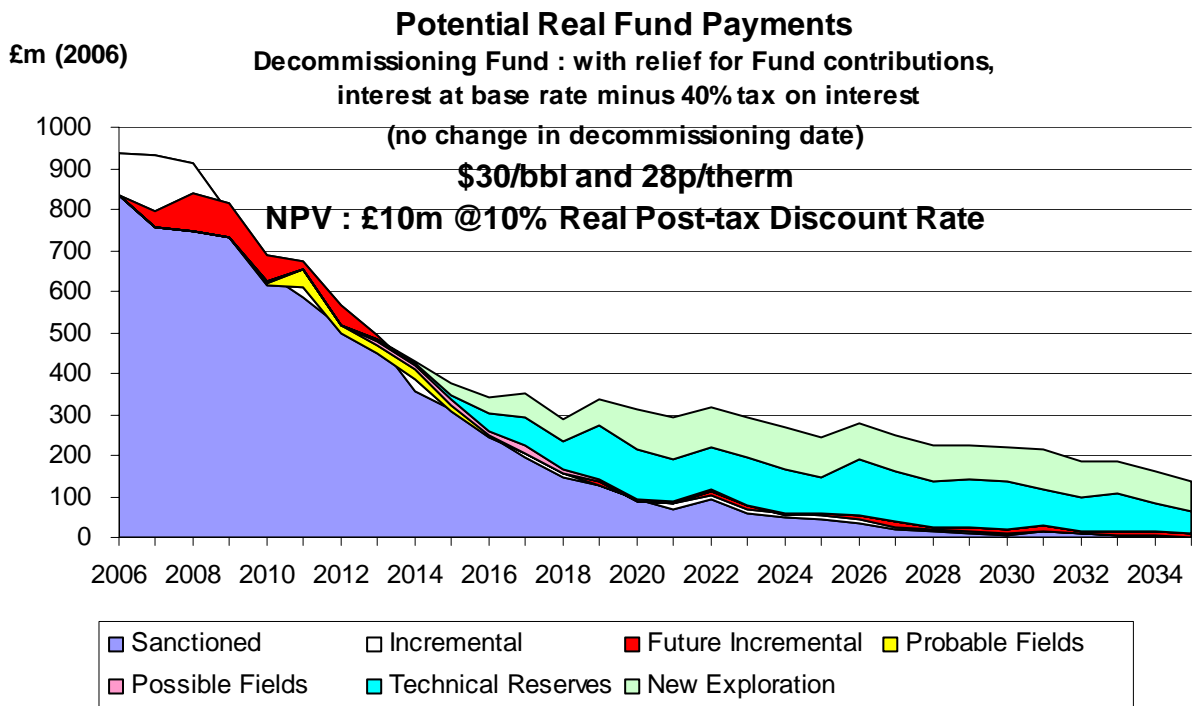he contributions but interest income in the Fund has been lost and sometimes the net result is that contributions plus interest do not meet the full decommissioning costs. A further problem in a number of cases was the significant time difference between COP and the actual decommissioning expenditures which distorted the application of the formula.

Chart 55

Potential Real Fund Shortfall
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
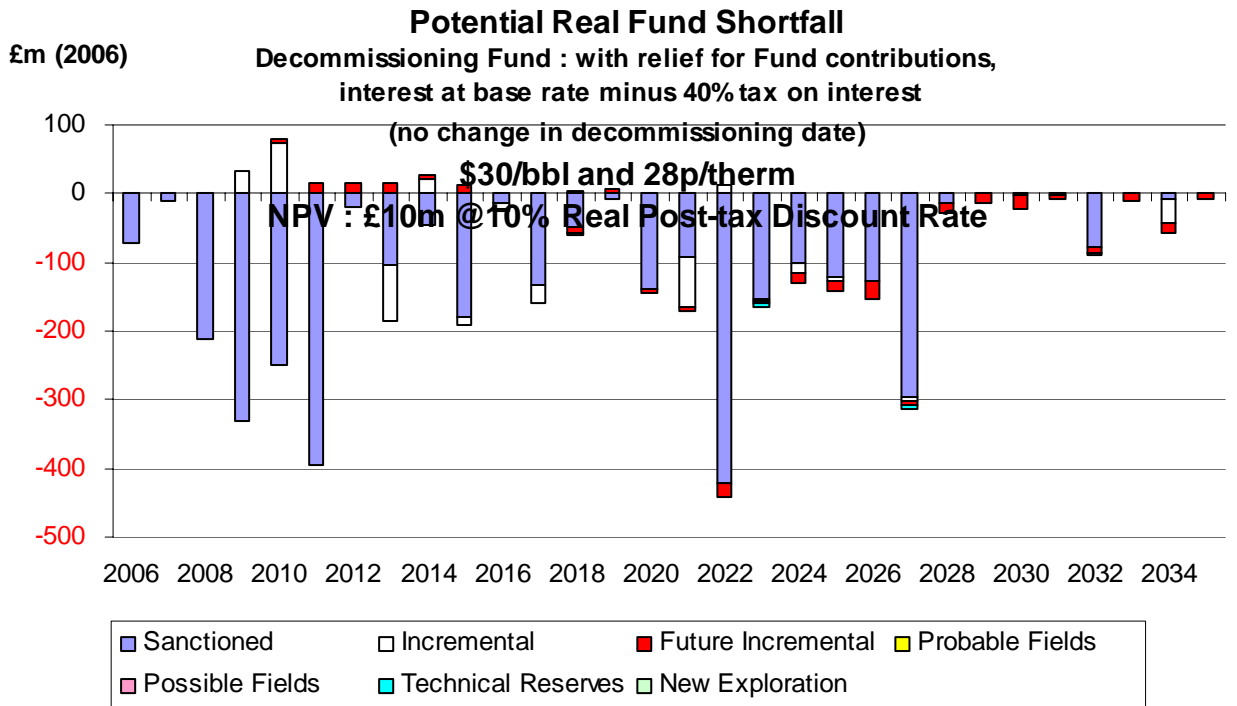
Chart 56 shows the change in operating costs excluding Fund contributions under the medium price. It cumulates to £1393m in the period to 2035.

Chart 56

Potential Change in Real Operating Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 57 shows the corresponding development expenditure foregone. It cumulates to £493m.

Chart 57

Potential Change in Real Development Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Discount Rate

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration

Chart 58 shows the corresponding potential production which may be foregone. This could cumulate to 133Mboe.

Chart 58

Potential Change in Production
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$30/bbl and 28p/therm
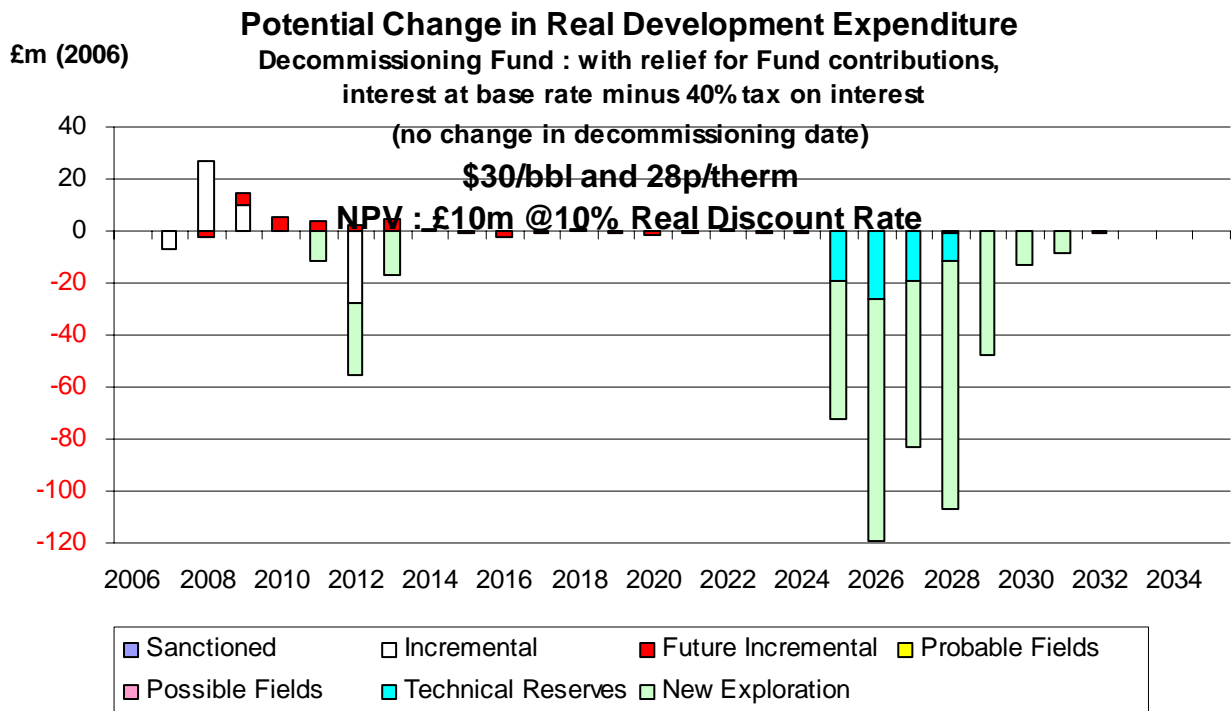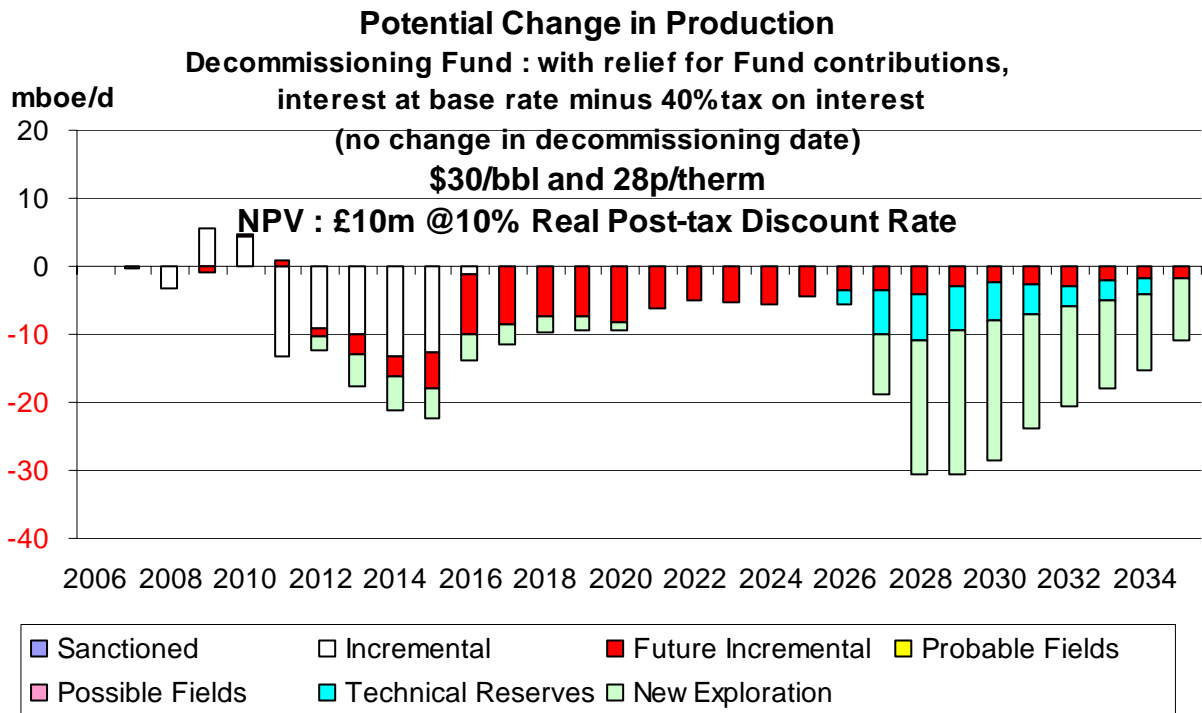**NPV : £10m @10% Real Post-tax Discount Rate**

mboe/d

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration

A quite substantial part of the loss of investment and operating costs and to production results from the failure of projects to pass the economic hurdle following the introduction of the Fund.

Chart 59 shows the change in tax revenue (excluding the tax on interest) which would be expected with the introduction of the Fund scheme. It cumulates to £3228m in the period to 2035.
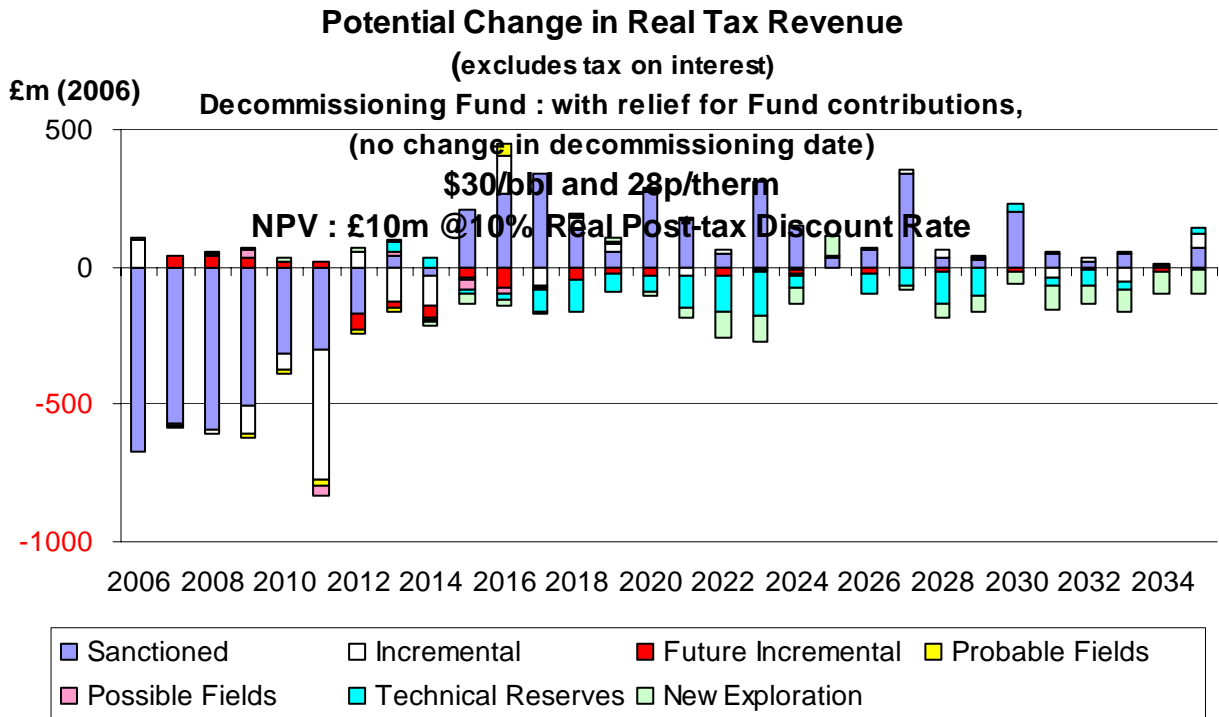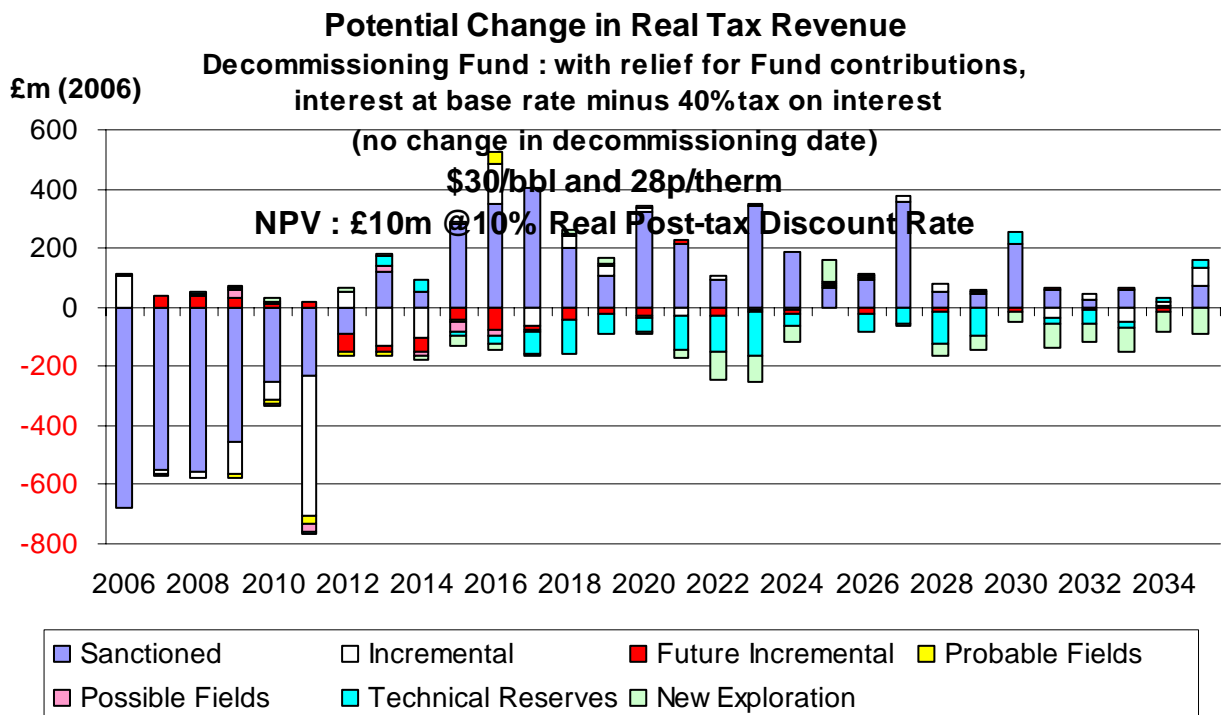
Chart 59

Potential Change in Real Tax Revenue
(excludes tax on interest)
Decommissioning Fund : with relief for Fund contributions,
(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 60 shows the change in tax revenue taking account of the tax on interest. It cumulates to a reduction of £1706m in the period to 2035.

Chart 60

Potential Change in Real Tax Revenue
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Under the $40, 36 pence price case the decommissioning costs are shown in Chart 61. They cumulate to £15083m in the period to 2035.
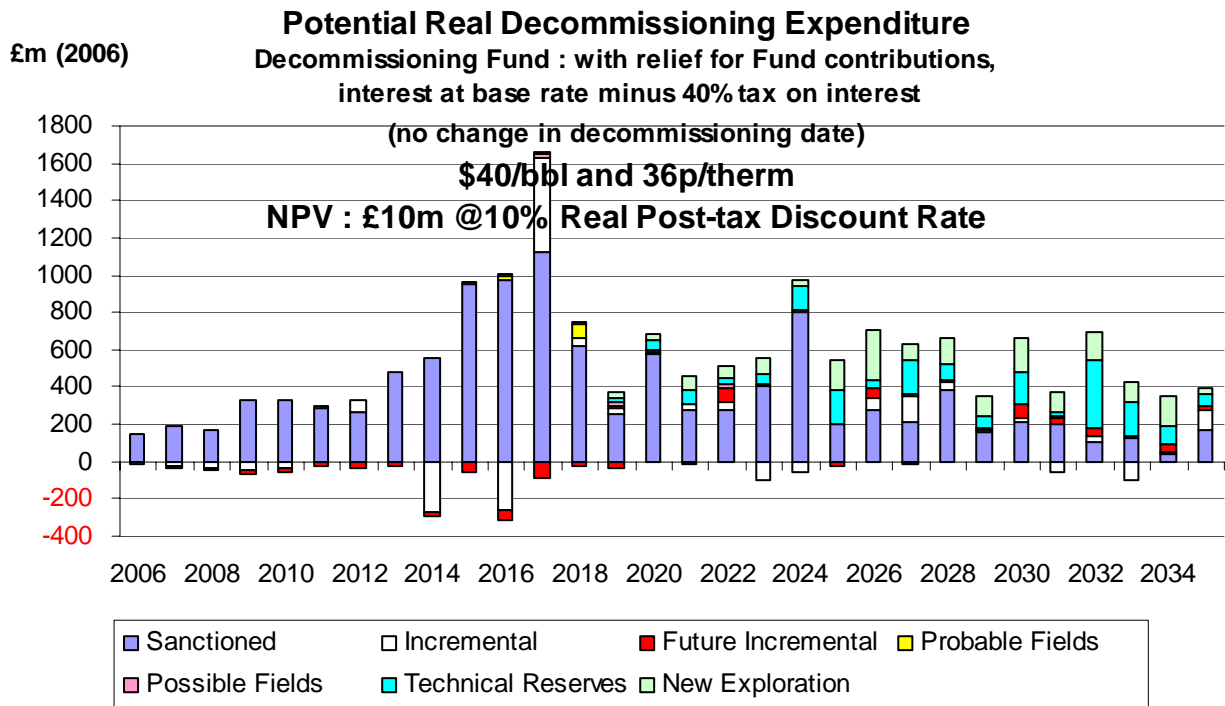
Chart 61

Potential Real Decommissioning Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Chart 62 shows the potential decommissioning relief. It cumulates to £9285m in the period to 2035.
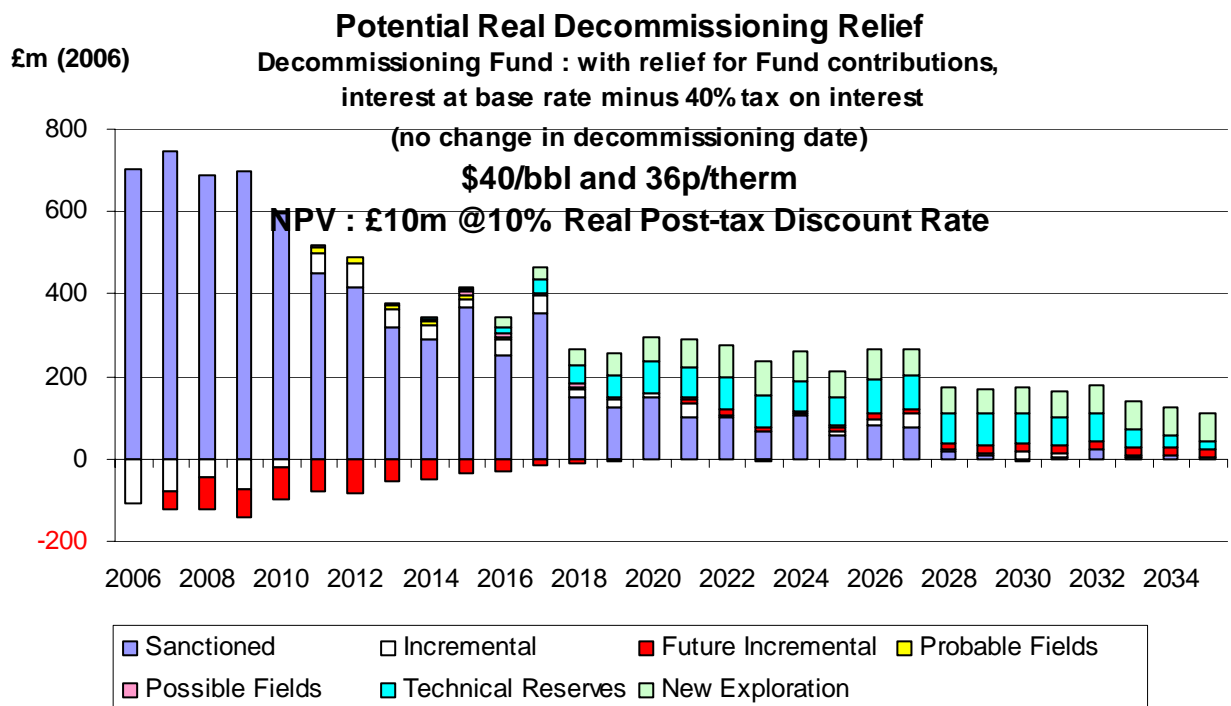
Chart 62

Potential Real Decommissioning Relief
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Chart 63 shows the tax on the Fund interest. It cumulates to £1600m in the period to 2035.

Chart 63

Potential Real Tax on Inerest
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

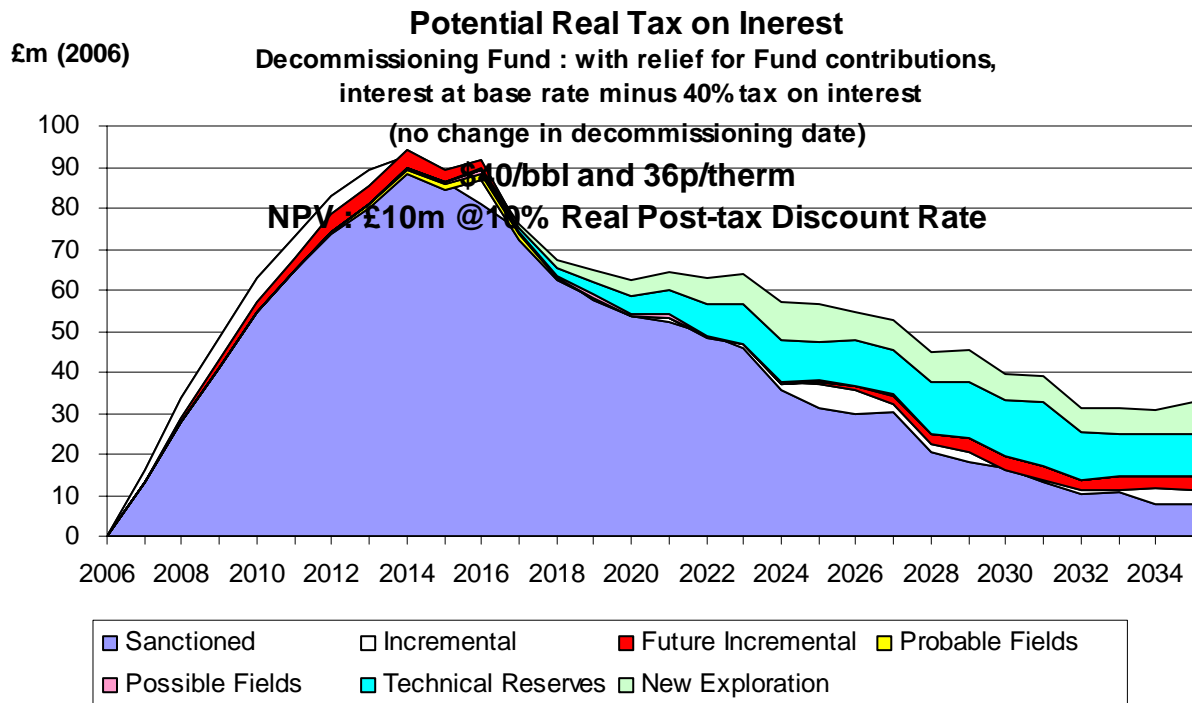Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 64 shows the payments paid into the Fund by the operators. They cumulate to £12403m in the period to 2035.

Chart 64

Potential Real Fund Payments
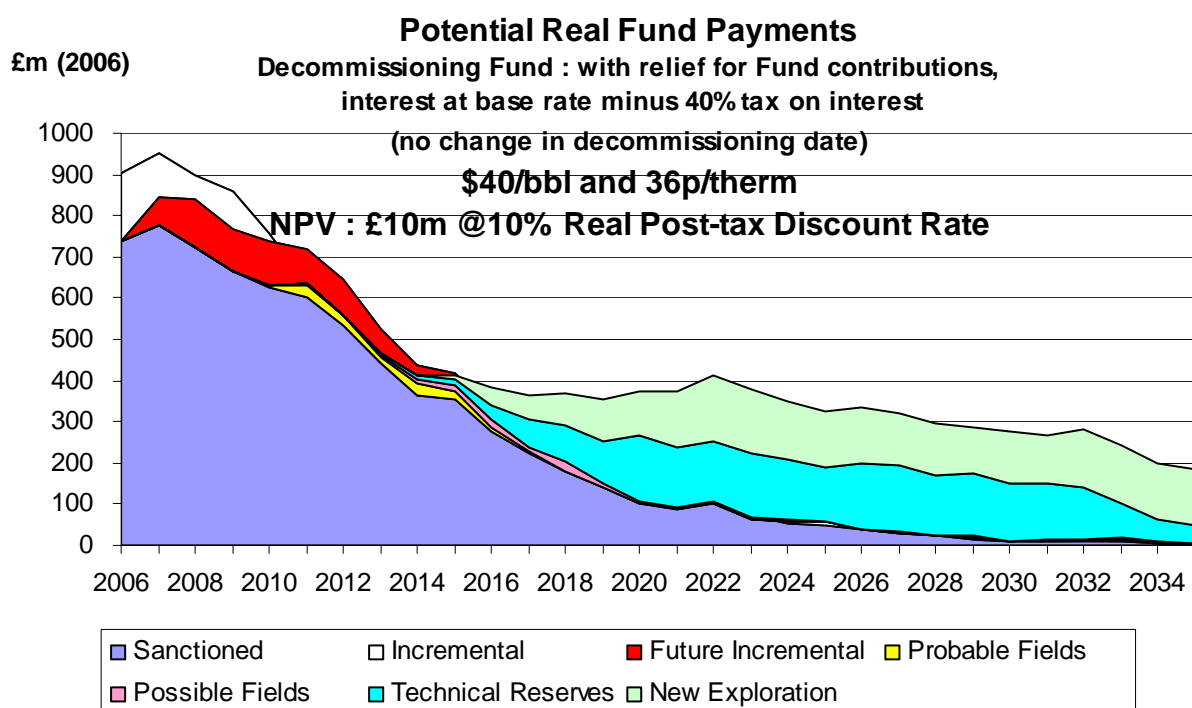Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 65 shows the potential Fund shortfall under the formula. It cumulates to £3456m in the period to 2035.

Chart 65

Potential Real Fund Shortfall
Decommissioning Fund : with relief for Fund contributions,
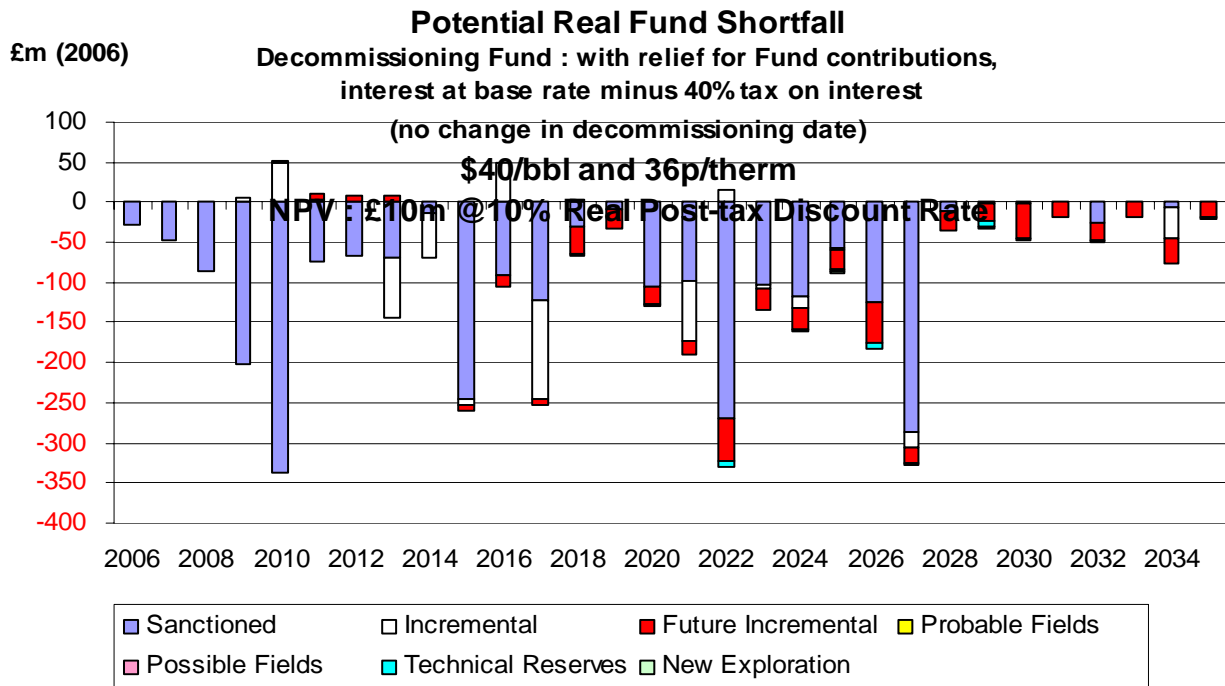interest at base rate minus 40% tax on interest

Chart 66 shows the change in operating costs including the Fund contributions. It cumulates to £55m in the period to 2035.

Chart 66

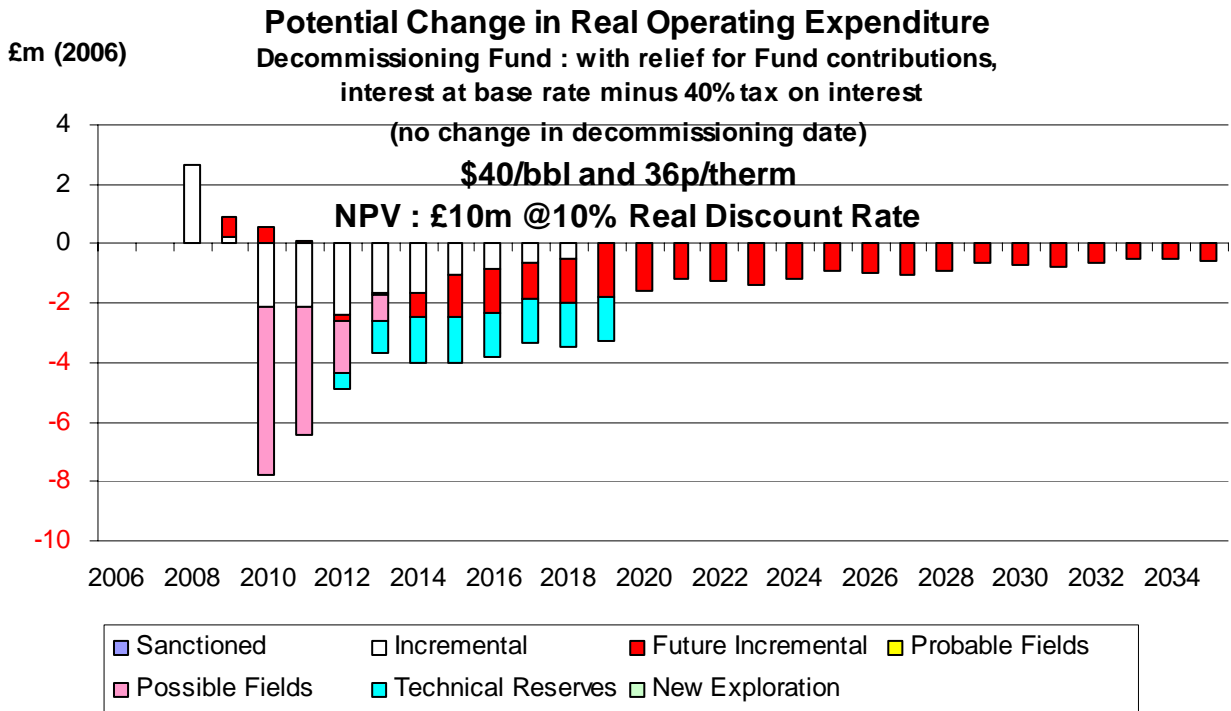**Potential Change in Real Operating Expenditure**
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Discount Rate

£m (2006)

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration

Chart 67 shows the corresponding change in development because very marginal fields are rendered uneconomic. It cumulates to £109m.
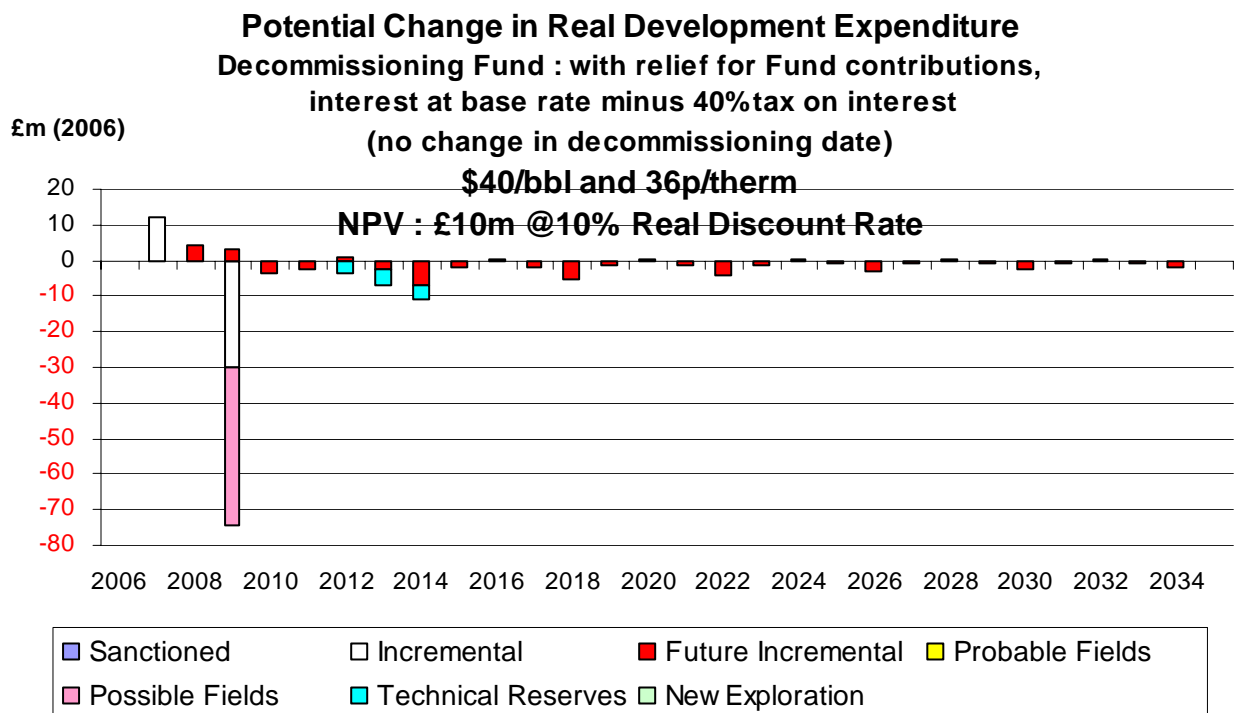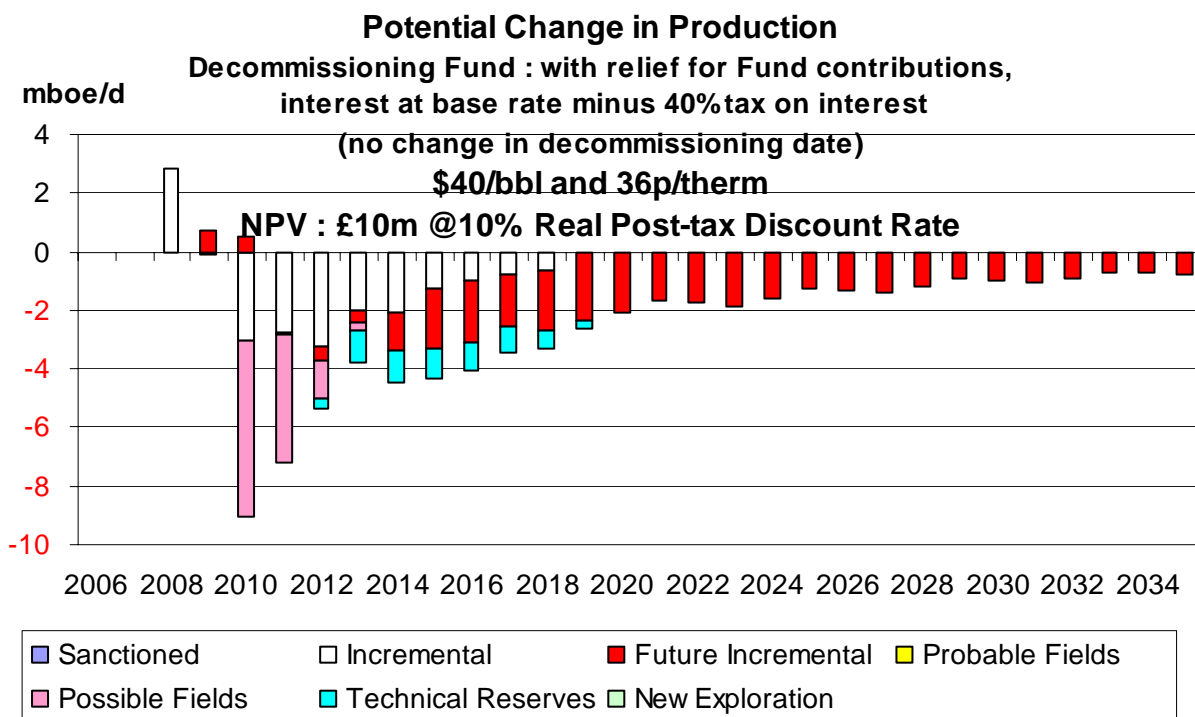
Chart 67

Potential Change in Real Development Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Discount Rate

£m (2006)

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration

Chart 68 shows the corresponding potential production which may be foregone. It cumulates to 23Mboe.

Chart 68

Potential Change in Production
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40%tax on interest
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

The loss of investment and production from the failure of projects to pass the economic hurdle following the introduction of the Fund was found to be very small.

Chart 69 shows the change in tax revenue (excluding the tax on interest) which would be expected with the introduction of the Fund scheme. This may cumulate to a reduction in tax revenue of £1918m in the period to 2035. It is noteworthy that the timing of the loss is accelerated by the scheme.
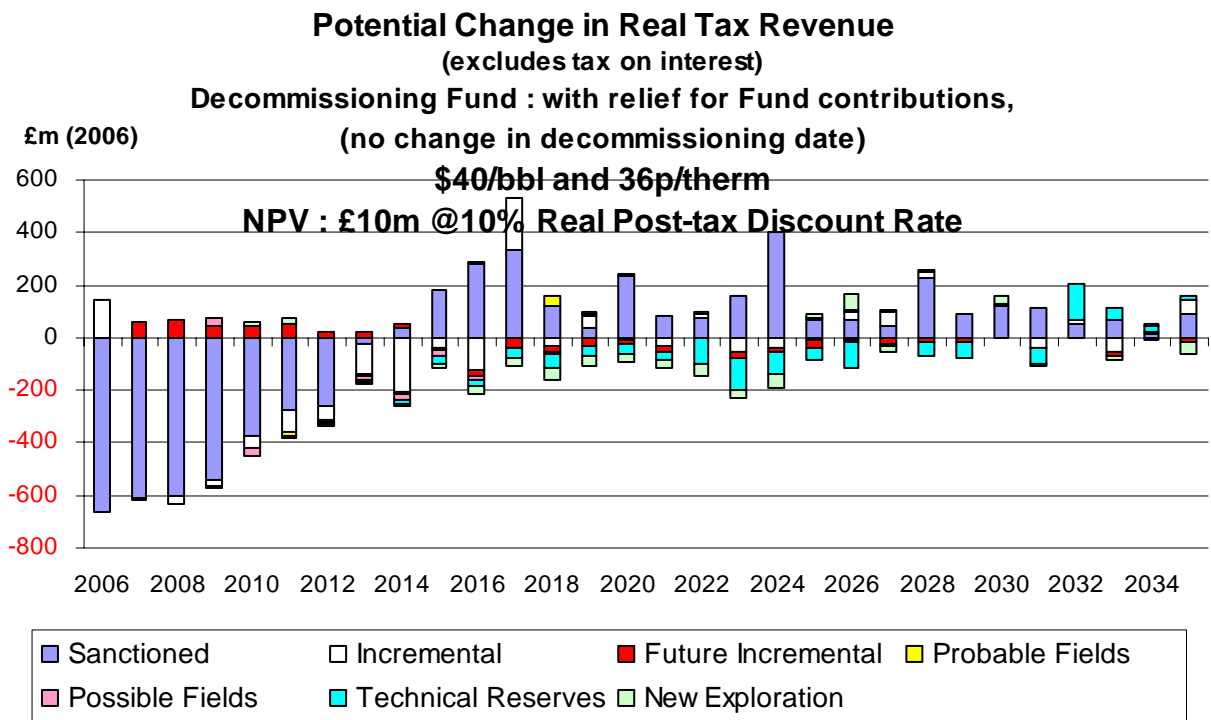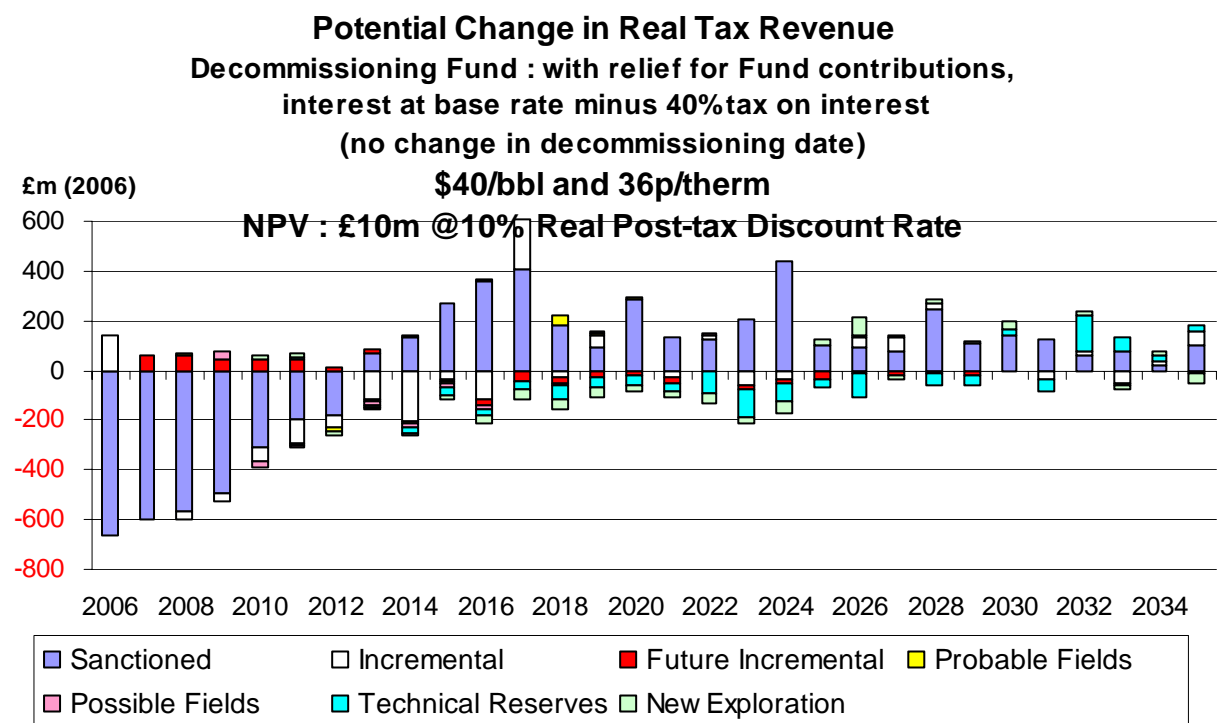
Chart 69

Potential Change in Real Tax Revenue
(excludes tax on interest)
Decommissioning Fund : with relief for Fund contributions,
(no change in decommissioning date)

$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration

Chart 70 shows the change in tax revenue taking account of the tax on interest. It cumulates to a reduction in tax revenue of £318m in the period to 2035 which is relatively small.

Chart 70

Potential Change in Real Tax Revenue
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
(no change in decommissioning date)

$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration

Fund 2

In this case the assumptions are the same as for Fund 1 except that the return attained by the Fund is 10% in MOD terms. Because of the higher return achieved by the Fund the total contributions are less than in the Fund 1 case.

Chart 71 shows the potential decommissioning costs with a Fund scheme paying gross interest of 10% and the medium price. The decommissioning cost may cumulate to £14014m in the period to 2035.
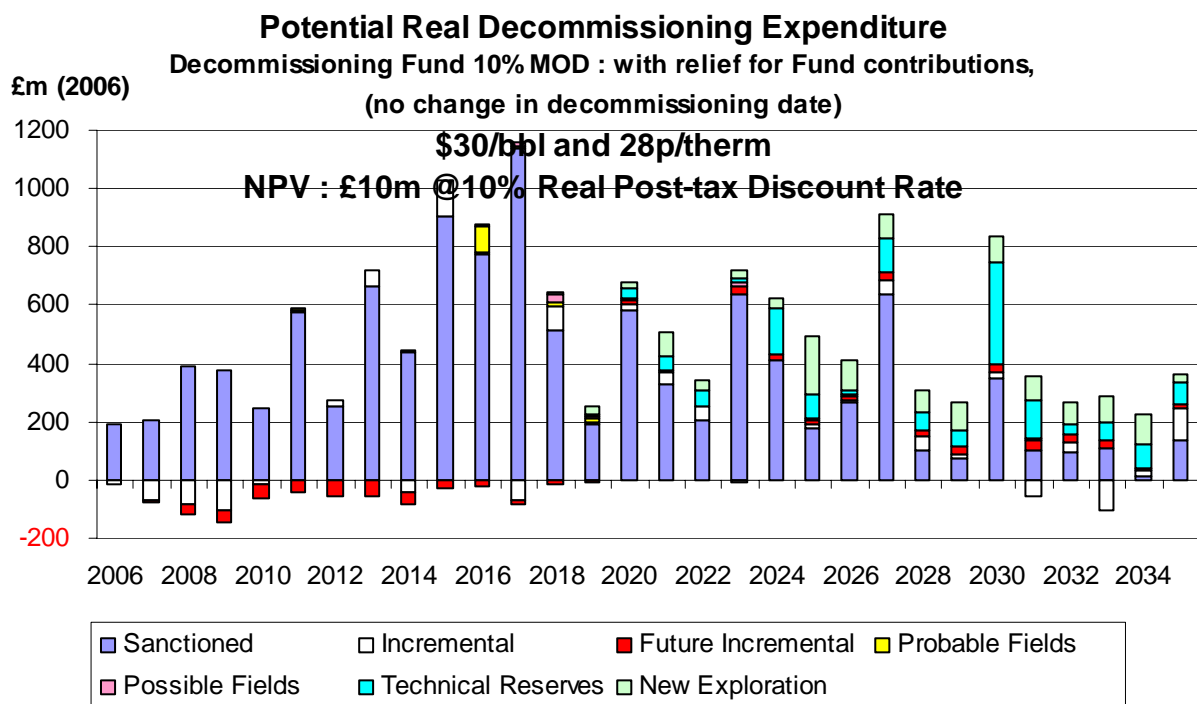
Chart 71

Potential Real Decommissioning Expenditure
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 72 shows the potential decommissioning relief. It cumulates to £7511m in the period to 2035.

Chart 72

Potential Real Decommissioning Relief
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
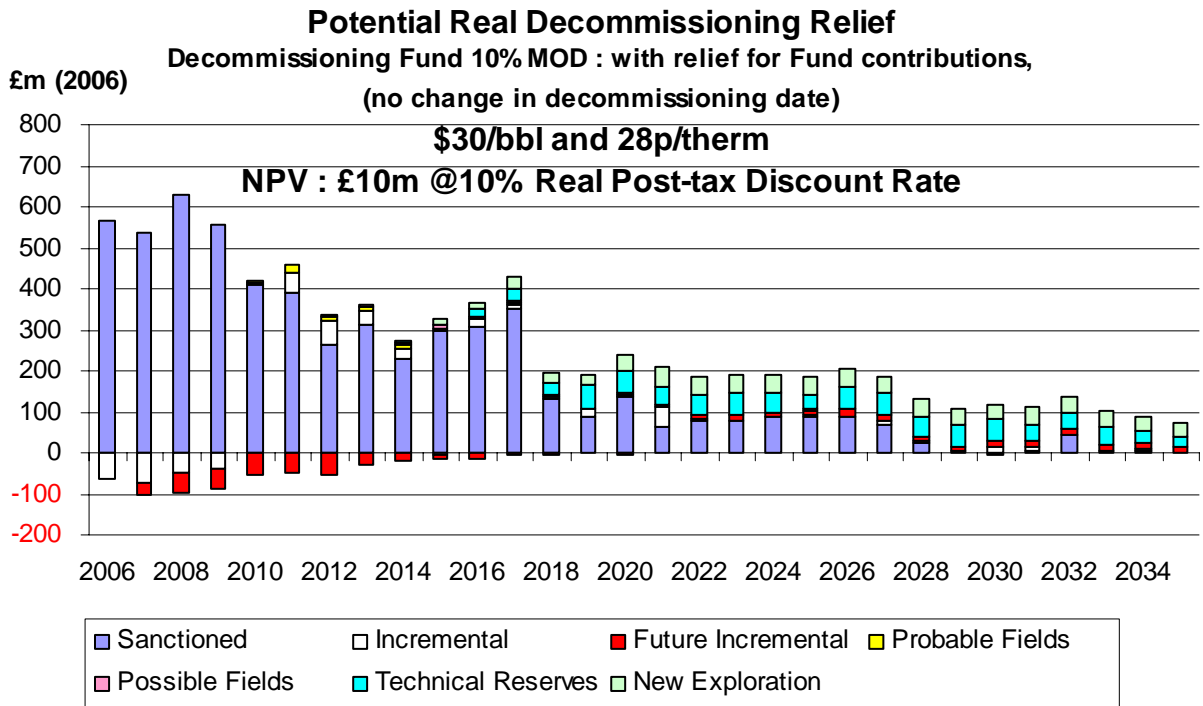
Chart 73 shows the tax on the Fund income. It cumulates to £2643m in the period to 2035.

Chart 73

Potential Real Tax on Interest
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
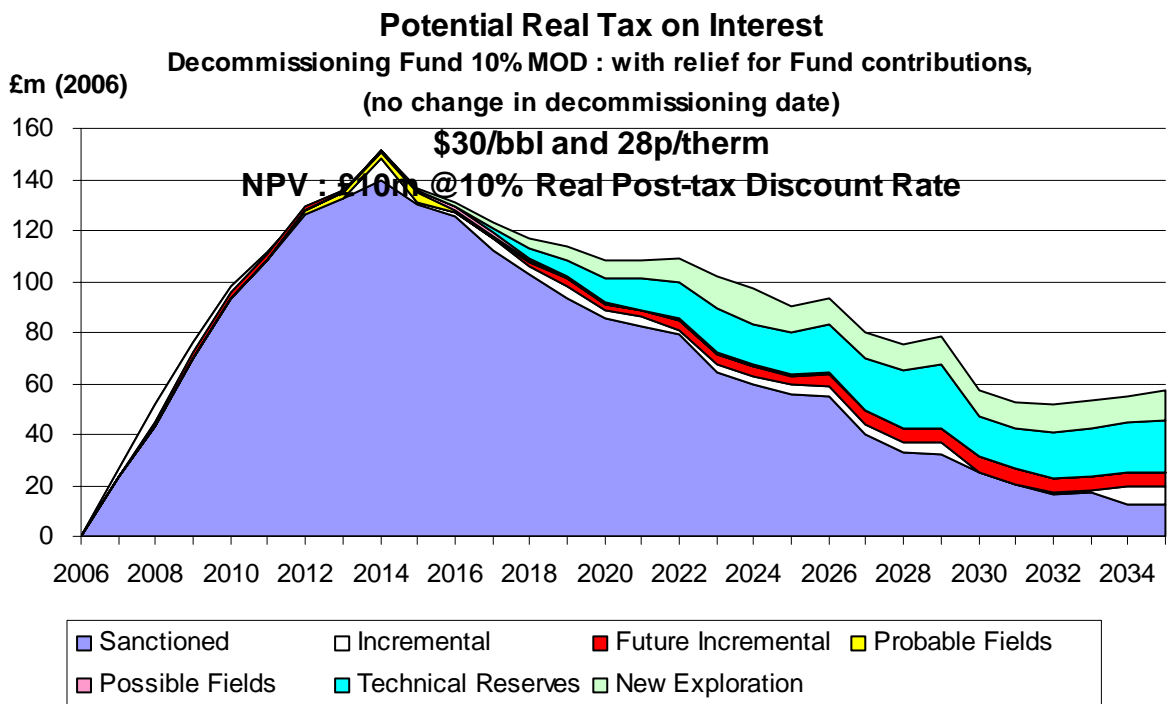
Chart 74 shows the real Fund payments paid by the licensees under the medium price. They cumulate to £9049m in the period to 2035.

Chart 74

Potential Real Fund Payments
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend:
- Sanctioned
- Incremental
- Future Incremental
- Probable Fields
- Possible Fields
- Technical Reserves
- New Exploration
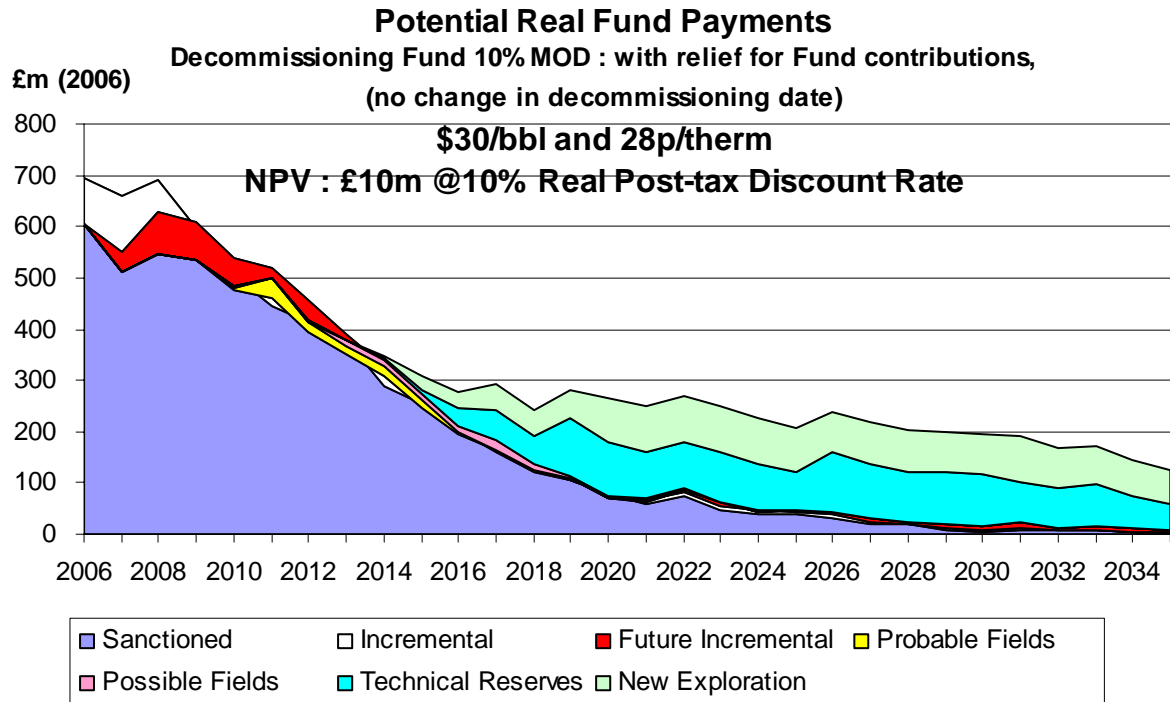
Chart 75 shows the potential Fund shortfall under the medium price. It cumulates to £3788m in the period to 2035.

Chart 75

Potential Real Fund Shortfall

Decommissioning Fund 10% MOD : with relief for Fund contributions,

(no change in decommissioning date)

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate
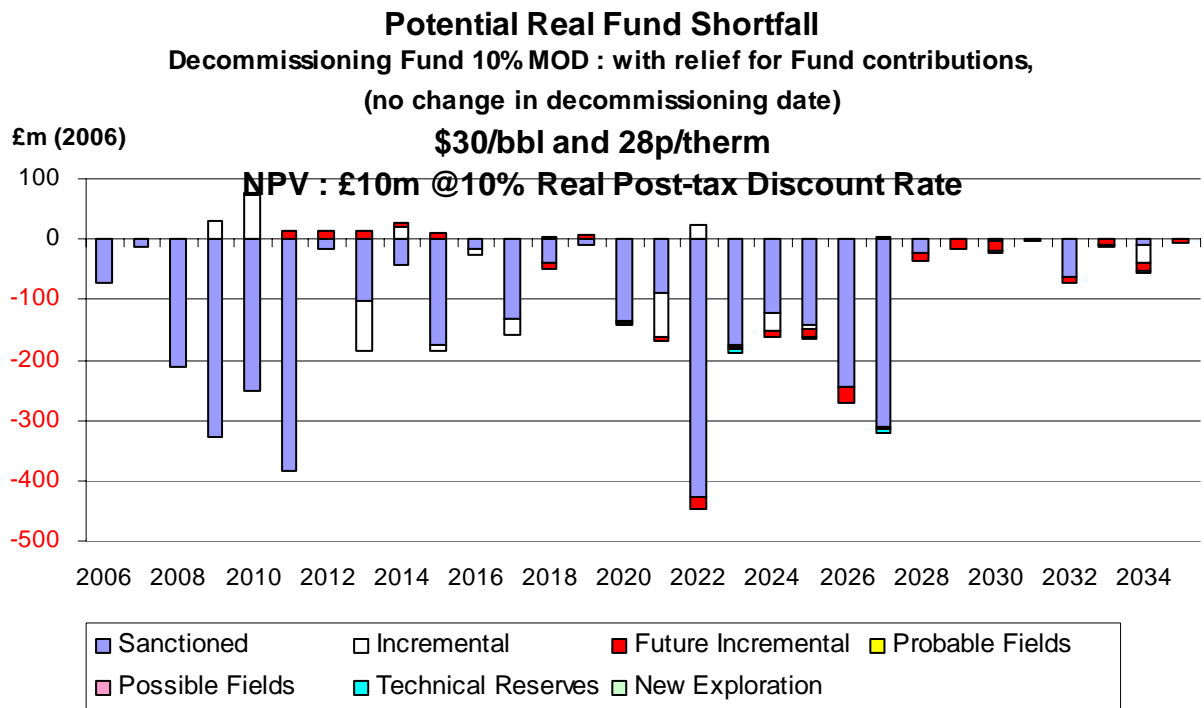
Chart 76 shows the change in operating costs of the Fund scheme. It cumulates to £1393m in the period to 2035.

Chart 76

Potential Change in Real Operating Expenditure

Decommissioning Fund 10% MOD : with relief for Fund contributions,

(no change in decommissioning date)

$30/bbl and 28p/therm

NPV : £10m @10% Real Post-tax Discount Rate
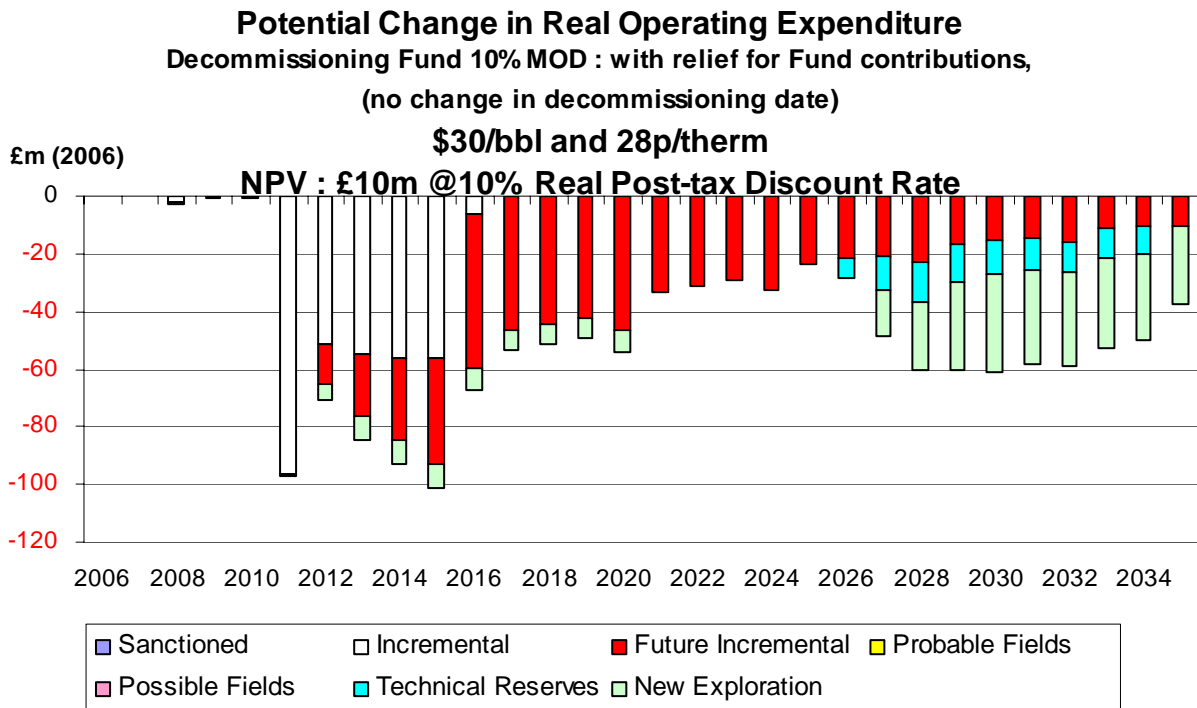
Chart 77 shows the corresponding development expenditure foregone. It cumulates to £493m.

Chart 77

Potential Change in Real Development Expenditure
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
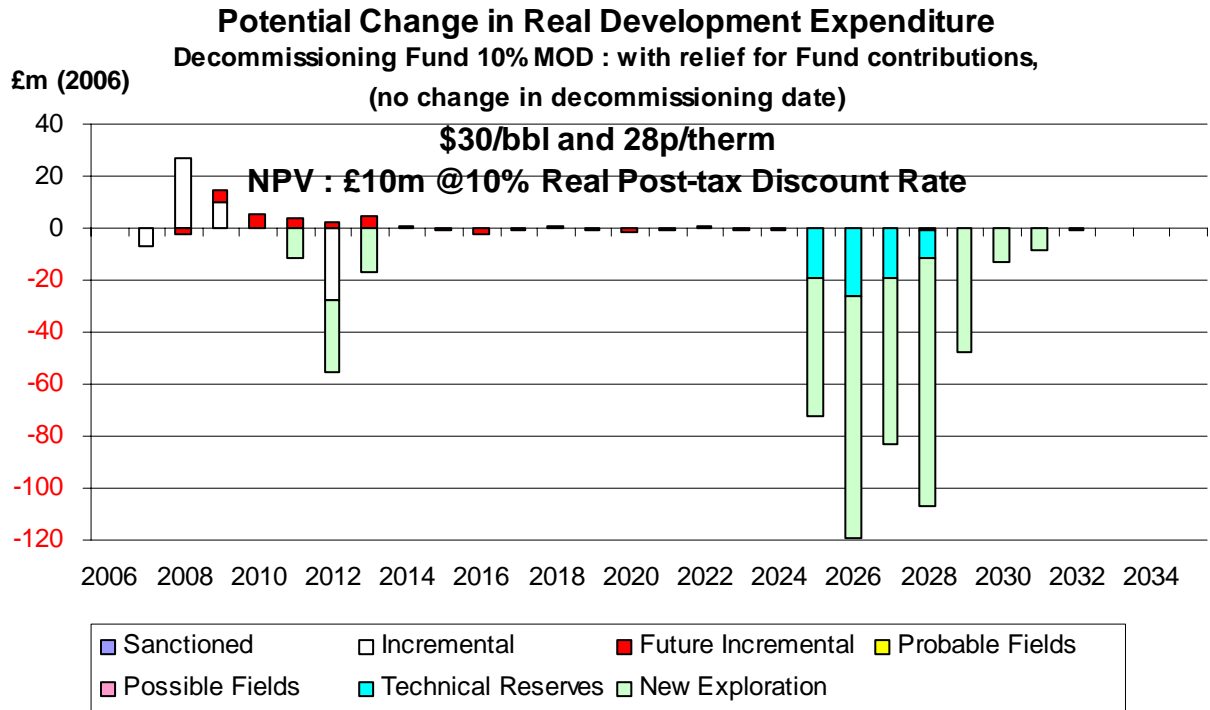
Chart 78 shows the corresponding potential production which may be foregone. This could cumulate to 133Mboe.

Chart 78

Potential Change in Production
Decommissioning Fund 10%MOD : with relief for Fund contributions,
(no change in decommissioning date)
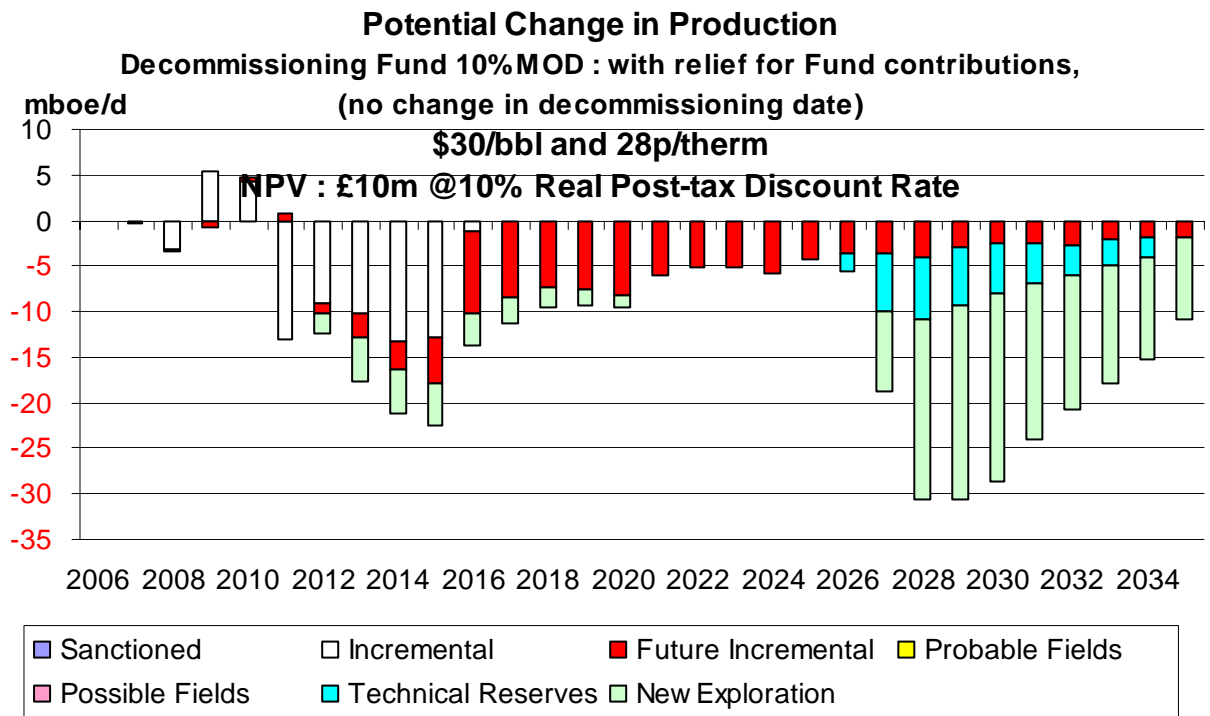
A quite substantial part of the losses in production occur because projects fail to pass the economic hurdle following the introduction of the Fund.

Chart 79 shows the change in tax revenues (excluding the tax on interest) which would be expected with the introduction of the Fund scheme. It cumulates to a reduction of £2022m in the period to 2035.

Chart 79

Potential Change in Real Tax Revenue
(excluding effect of tax on interest)
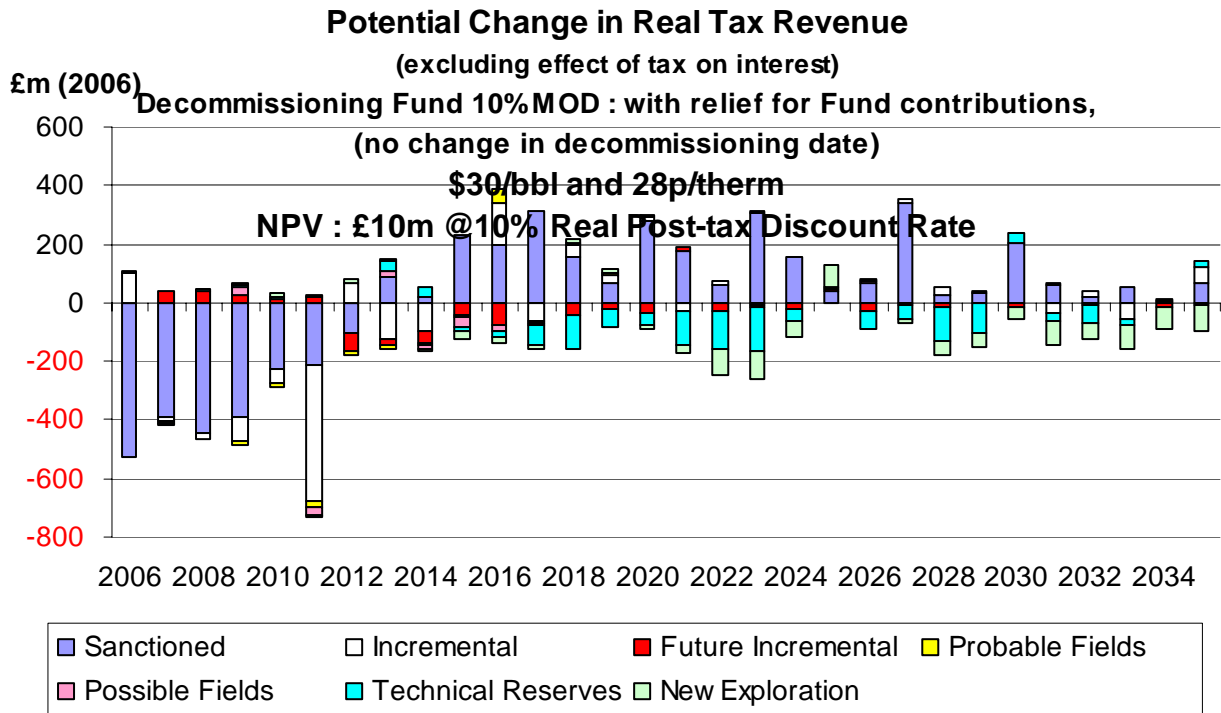
Chart 80 shows the change in tax revenues taking into account the tax on Fund income. This cumulates to an increase in tax revenue of £621m in the period to 2035.

Chart 80

Potential Change in Real Tax Revenue
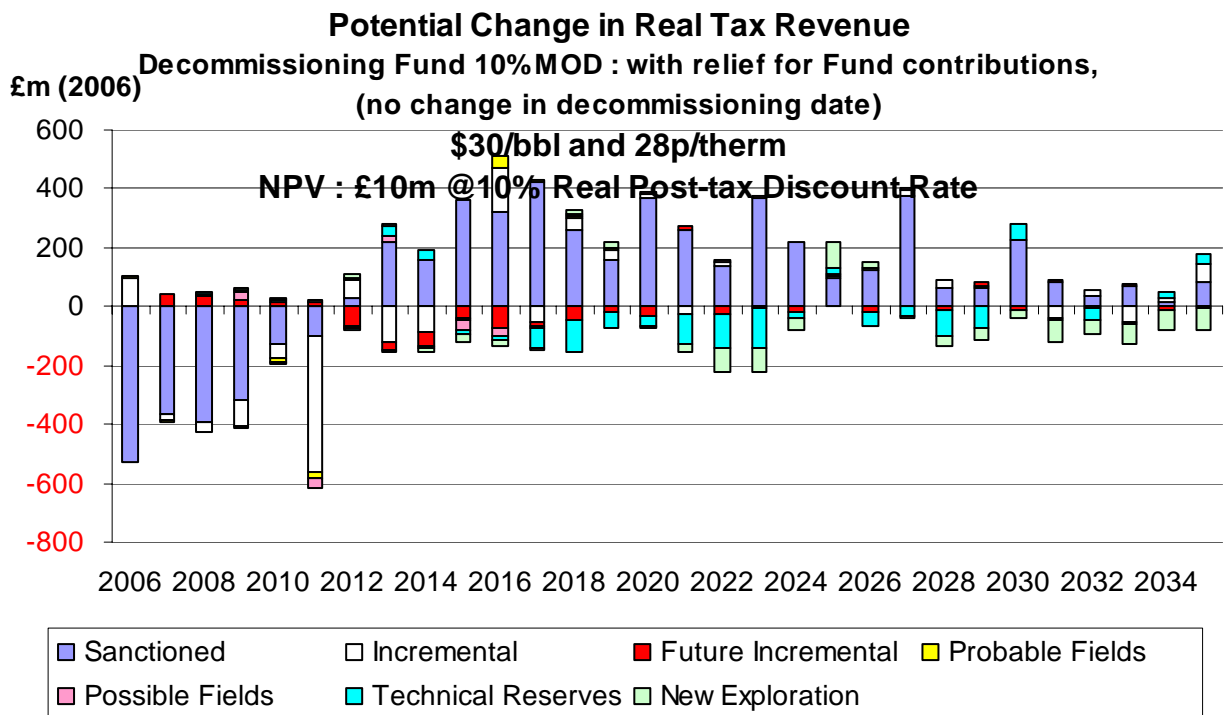
Chart 81 shows the potential decommissioning costs with a Fund scheme receiving gross income of 10% under the high price. The decommissioning cost cumulates to £15083m in the period to 2035.

Chart 81

Potential Real Decommissioning Expenditure
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)

£m (2006)

$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
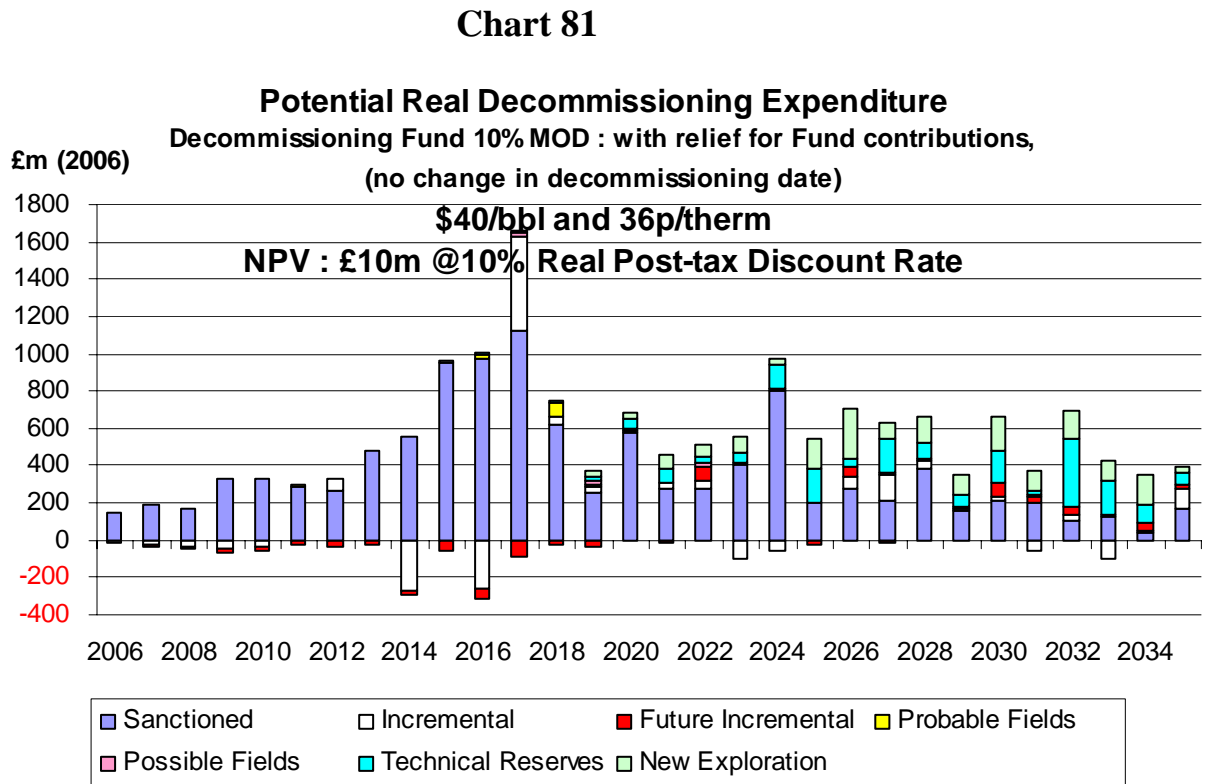
Chart 82 shows the potential decommissioning relief under the high price. It cumulates to £7950m in the period to 2035.

Chart 82

Potential Real Decommissioning Relief
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)
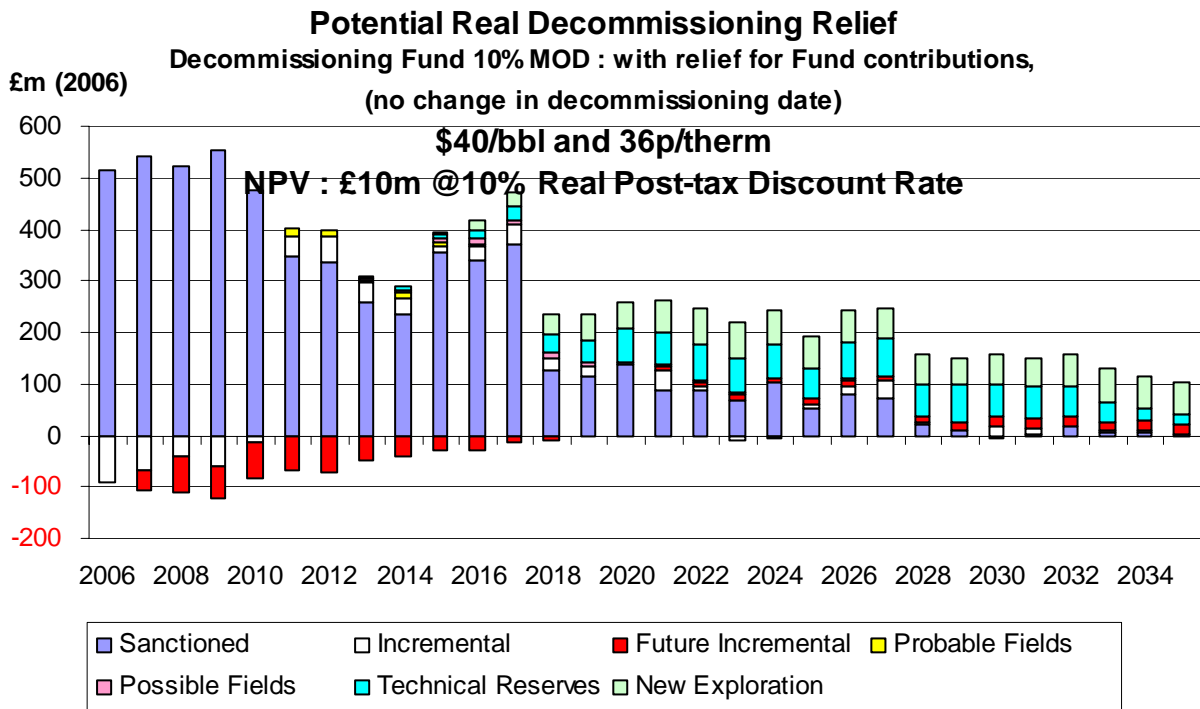
Chart 83 shows the tax on the Fund interest with the $40, 36p price. It cumulates to £2754m in the period to 2035.

Chart 83

Potential Real Tax on Interest
Decommissioning Fund 10% MOD : with relief for Fund contributions,
(no change in decommissioning date)
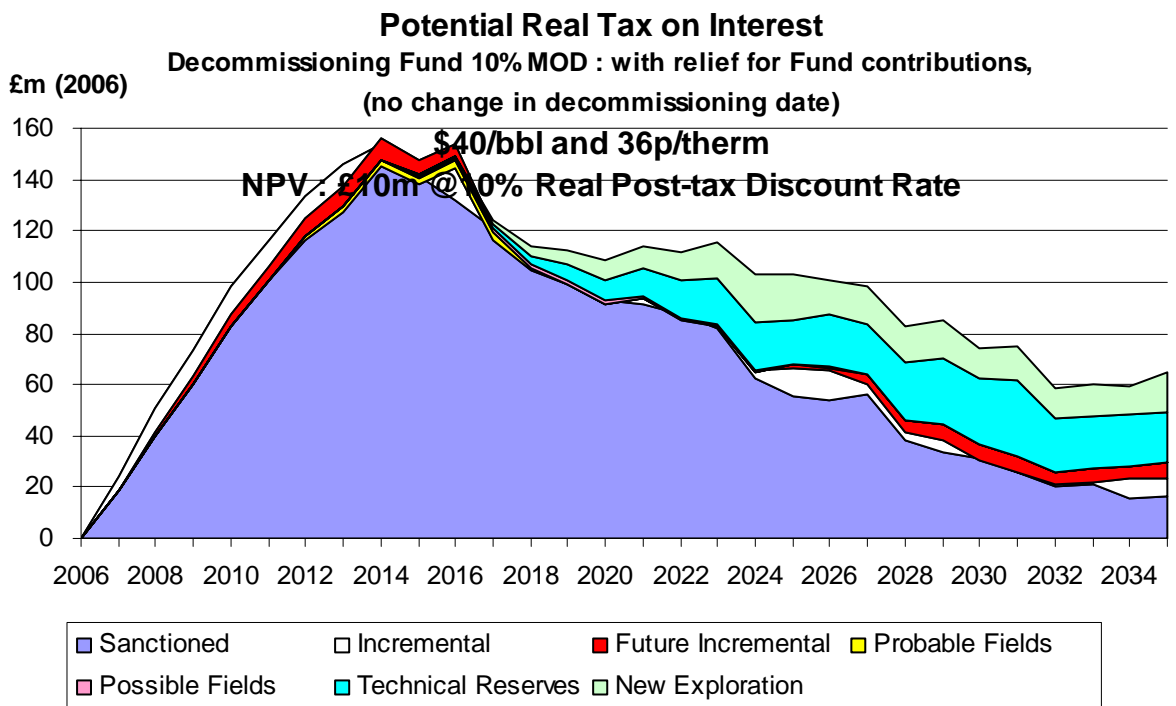
Chart 84 shows the real Fund payments paid by the operators. They cumulate to £10030m in the period to 2035.

Chart 84

Potential Real Fund Payments
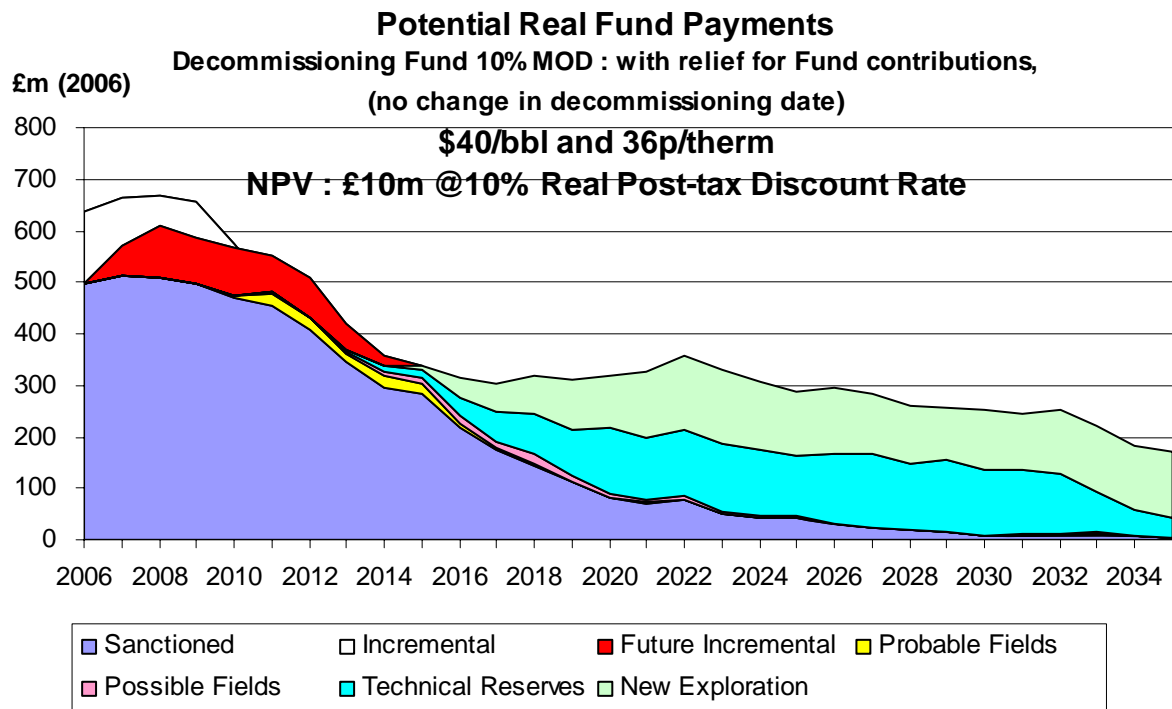
Chart 85 shows the potential Fund shortfall under the medium price. It cumulates to £3684m in the period to 2035.

Chart 85

Potential Real Fund Shortfall

Decommissioning Fund 10% MOD : with relief for Fund contributions,

(no change in decommissioning date)

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)
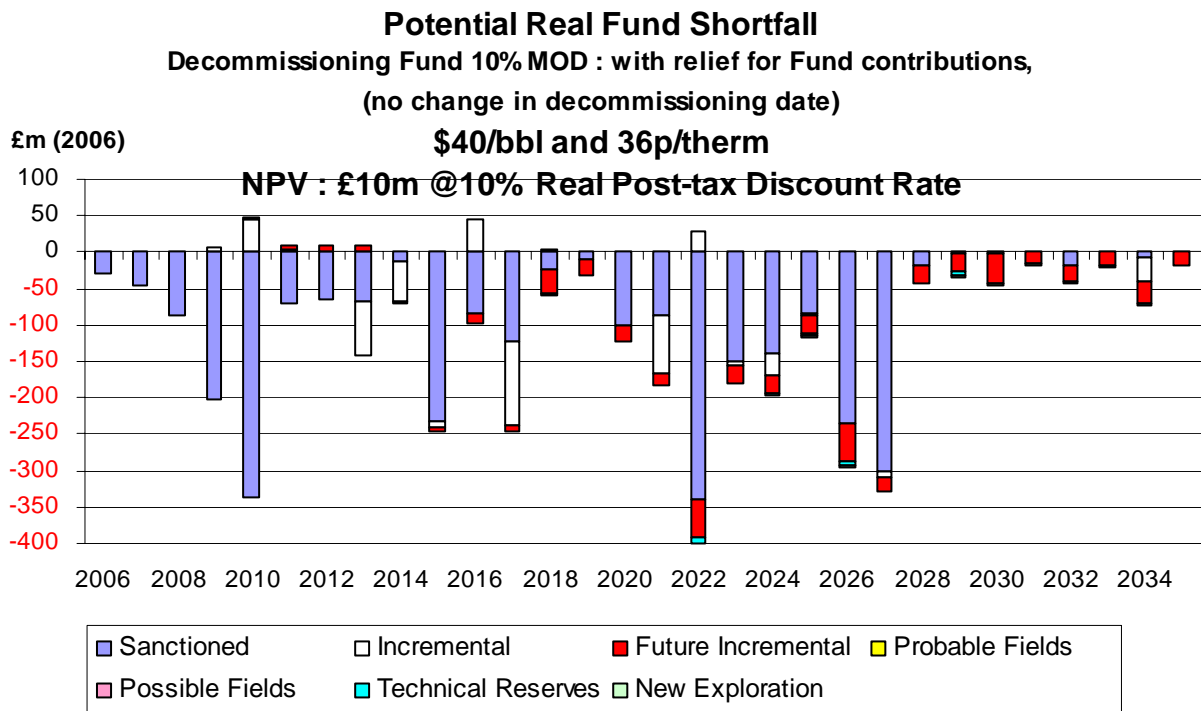
Chart 86 shows the change in operating costs which may occur with a Fund scheme under the high price. The change in operating costs may cumulate to £55m in the period to 2035.

Chart 86

Potential Change in Real Operating Expenditure

Decommissioning Fund 10% MOD : with relief for Fund contributions,

(no change in decommissioning date)

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)
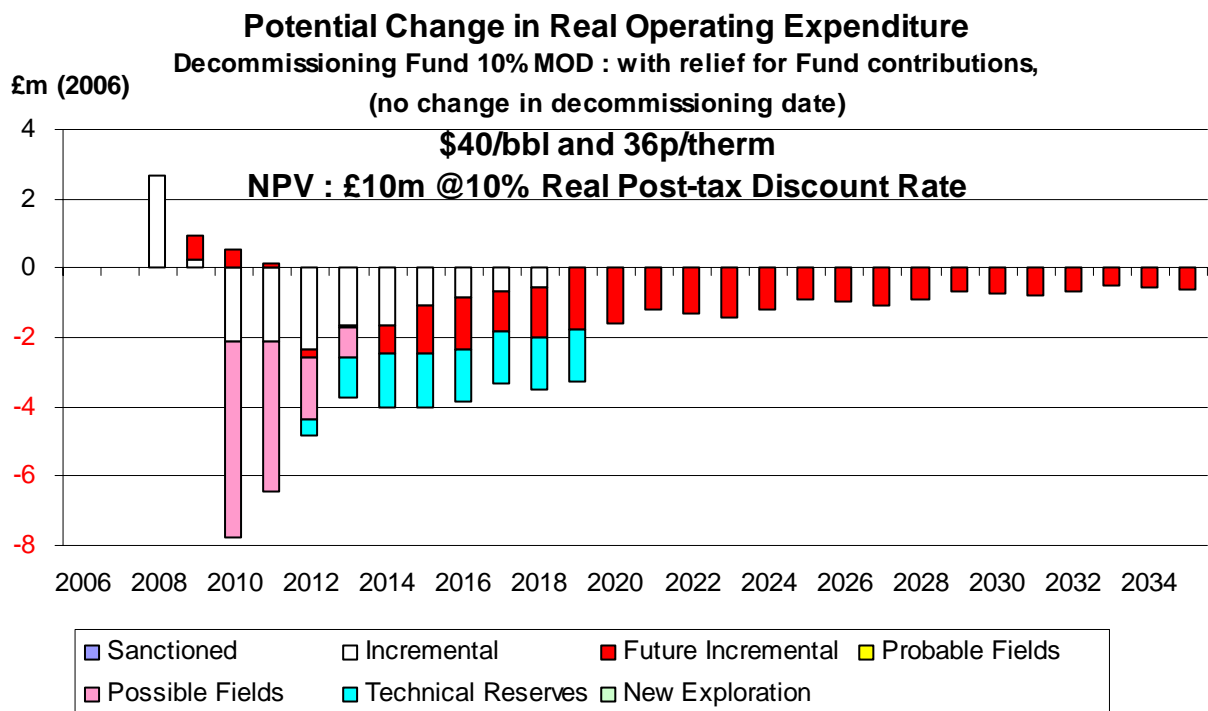
Chart 87 shows the corresponding development expenditure foregone. It may cumulate to £109m.

Chart 87

Potential Change in Real Development Expenditure
Decommissioning Fund 10%MOD : with relief for Fund contributions,
(no change in decommissioning date)
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: ▢ Sanctioned   ▢ Incremental   ■ Future Incremental   ▢ Probable Fields   ▢ Possible Fields   ▢ Technical Reserves   ▢ New Exploration
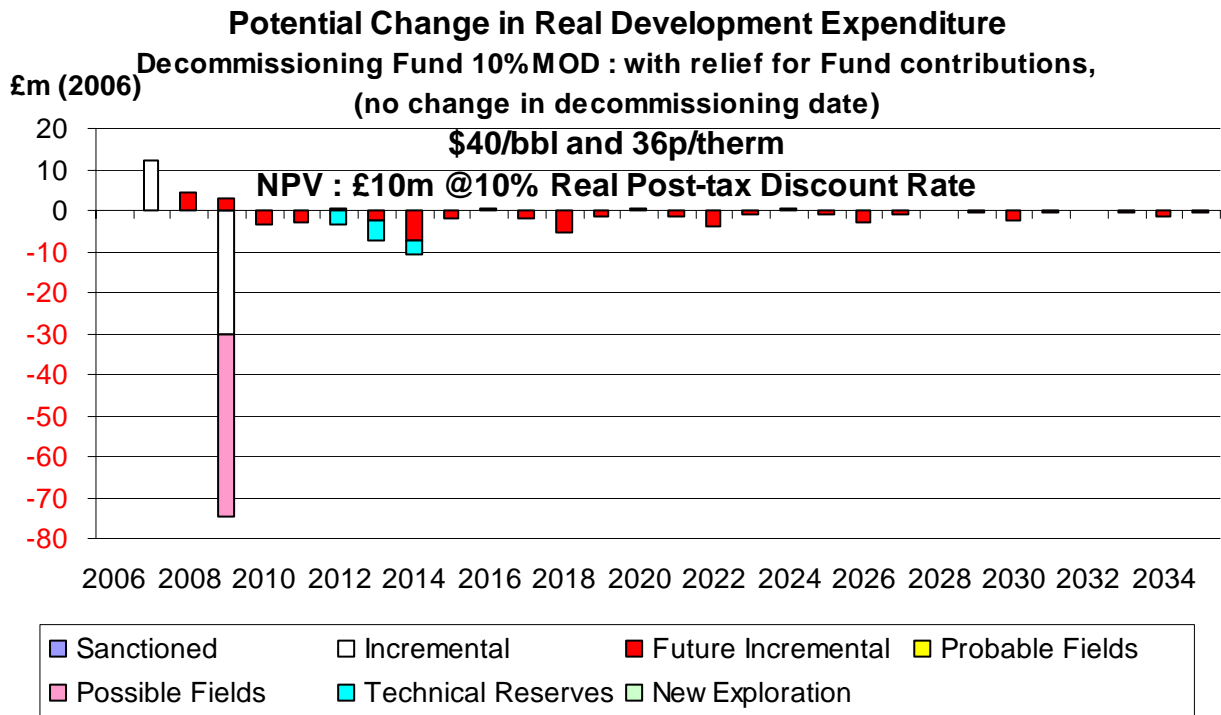
Chart 88 shows the corresponding potential production which may be foregone. This could cumulate to 23Mboe.

Chart 88

Potential Change in Production
Decommissioning Fund 10%MOD : with relief for Fund contributions,
(no change in decommissioning date)
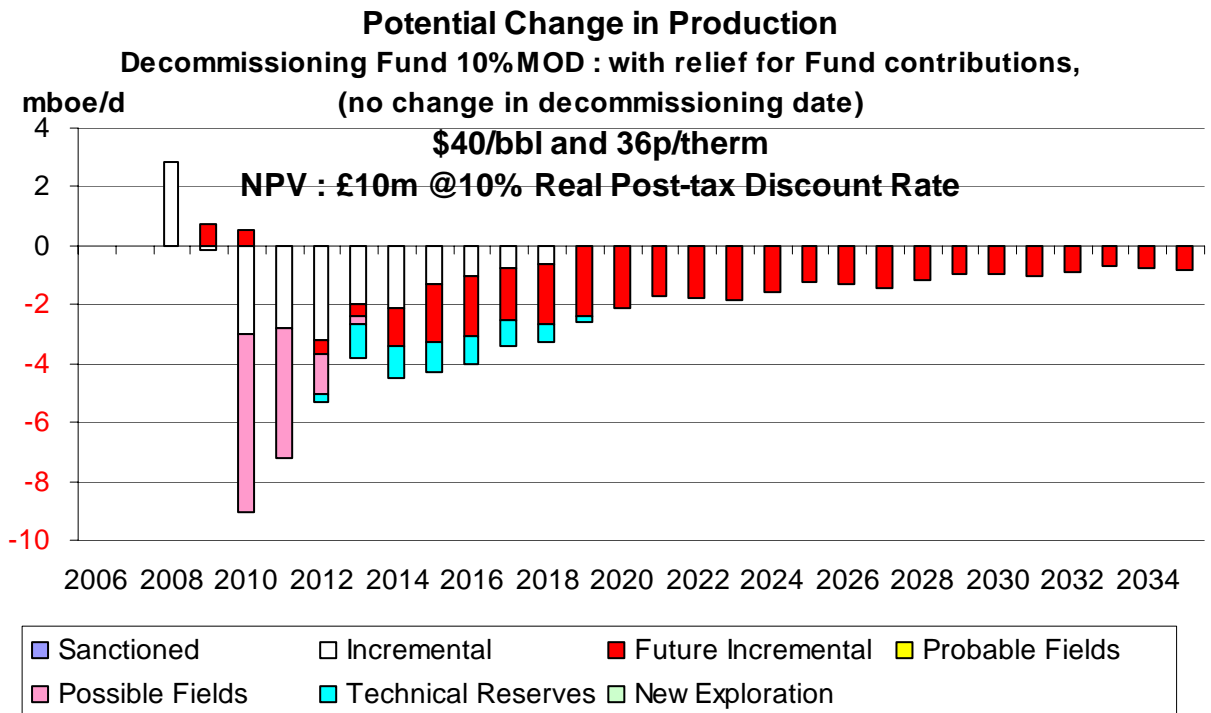
Under this scheme there is very little loss of production from the failure of projects to pass the economic hurdle.

Chart 89 shows the change in tax revenues (excluding the tax on interest).
These cumulate to £660m in the period to 2035.

Chart 89

Potential Change in Real Tax Revenue
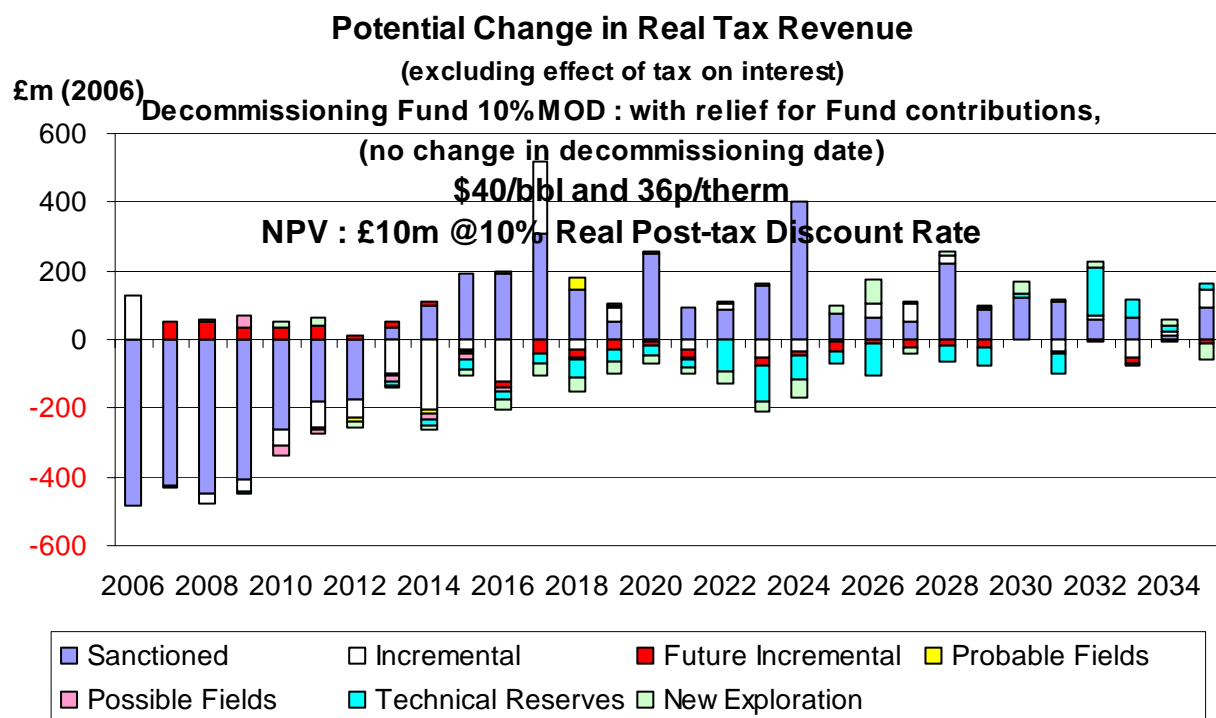
Chart 90 shows the change in tax revenues taking into account the tax on
Fund income. This cumulates to an <u>increase</u> in tax revenue of £2094m in
the period to 2035 when the tax on interest is included.

Chart 90

Potential Change in Real Tax Revenue

Decommissioning Fund 10%MOD : with relief for Fund contributions,

(no change in decommissioning date)

£m (2006)

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration
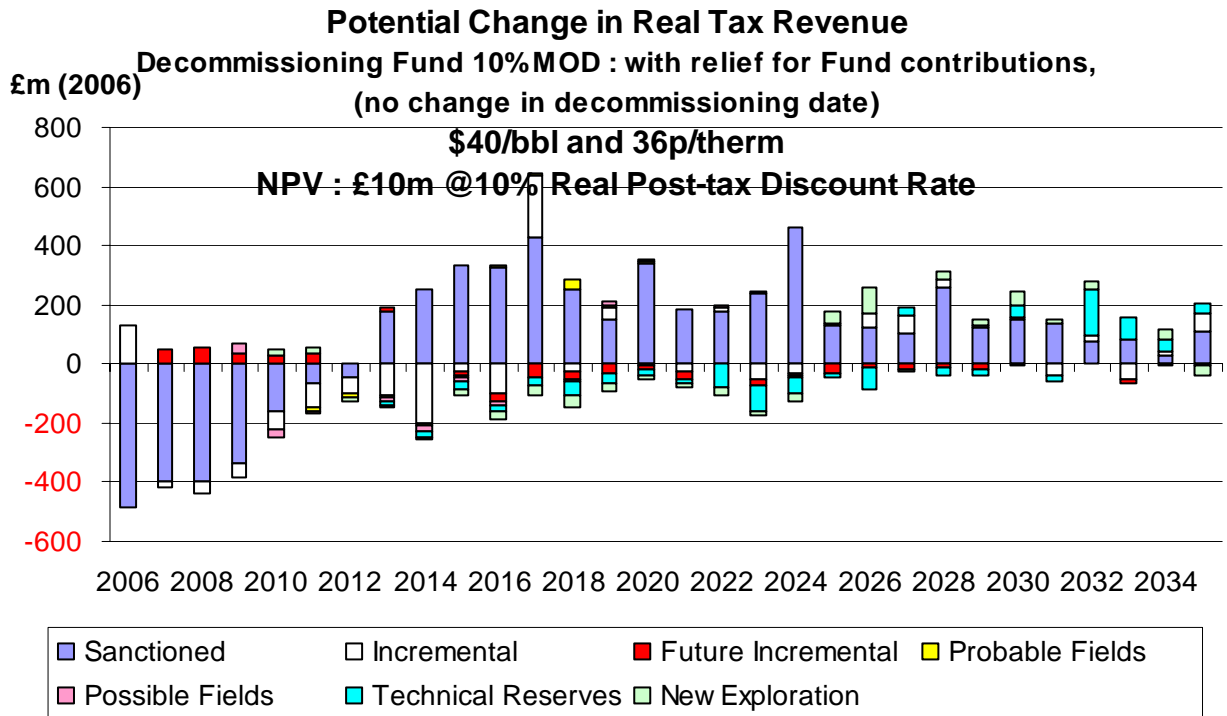
Fund 3

The assumptions for the 3rd Fund scheme are same as for Fund 2, except that it is assumed that there may be behavioural changes, namely acceleration of decommissioning to avoid negative cash flows. As with Funds 1 and 2 investment in very marginal projects may be deterred because of Fund payments.

Chart 91 shows the potential decommissioning costs under the medium price. The decommissioning cost may cumulate to £13273m in the period to 2035.

Chart 91

Potential Real Decommissioning Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
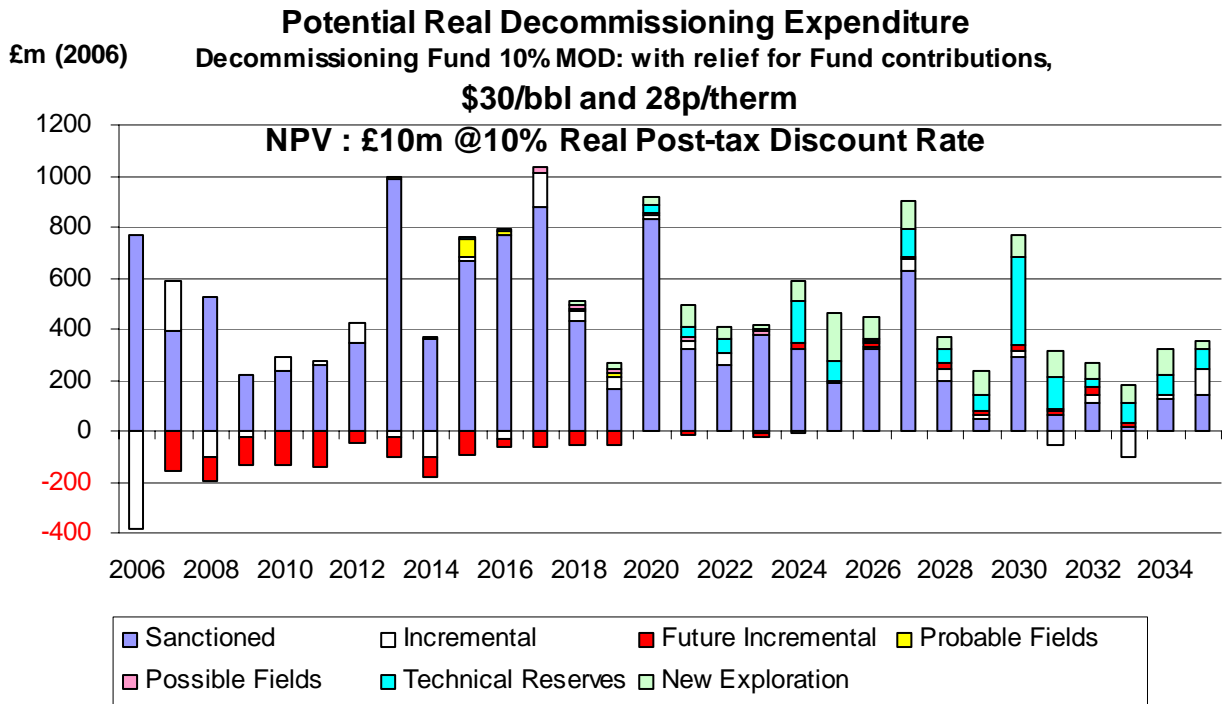
Chart 92 shows the potential decommissioning relief. It cumulates to £7404m in the period.

Chart 92

Potential Real Decommissioning Relief
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
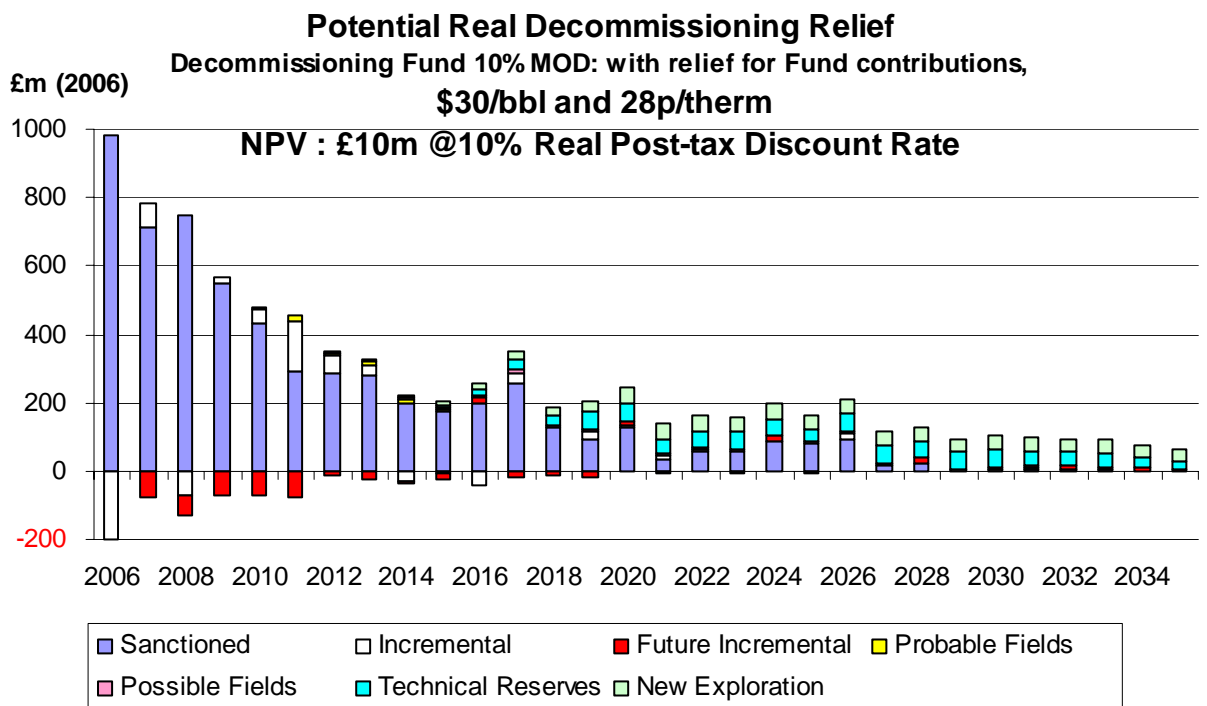
Chart 93 shows the tax on the Fund income change. This tax may cumulate to £2745m in the period to 2035.

Chart 93

Potential Real Tax on Interest
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
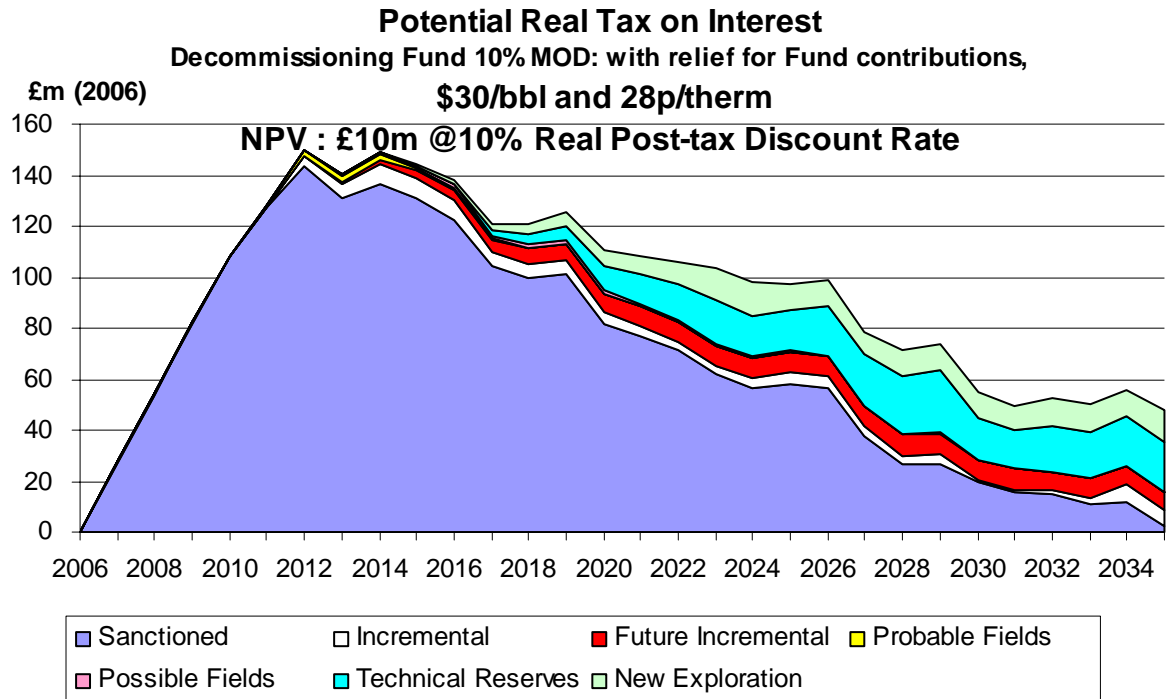
Chart 94 shows the real Fund payments paid by the operators. They may cumulate to £10593m in the period.

Chart 94

Potential Real Fund Payments
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
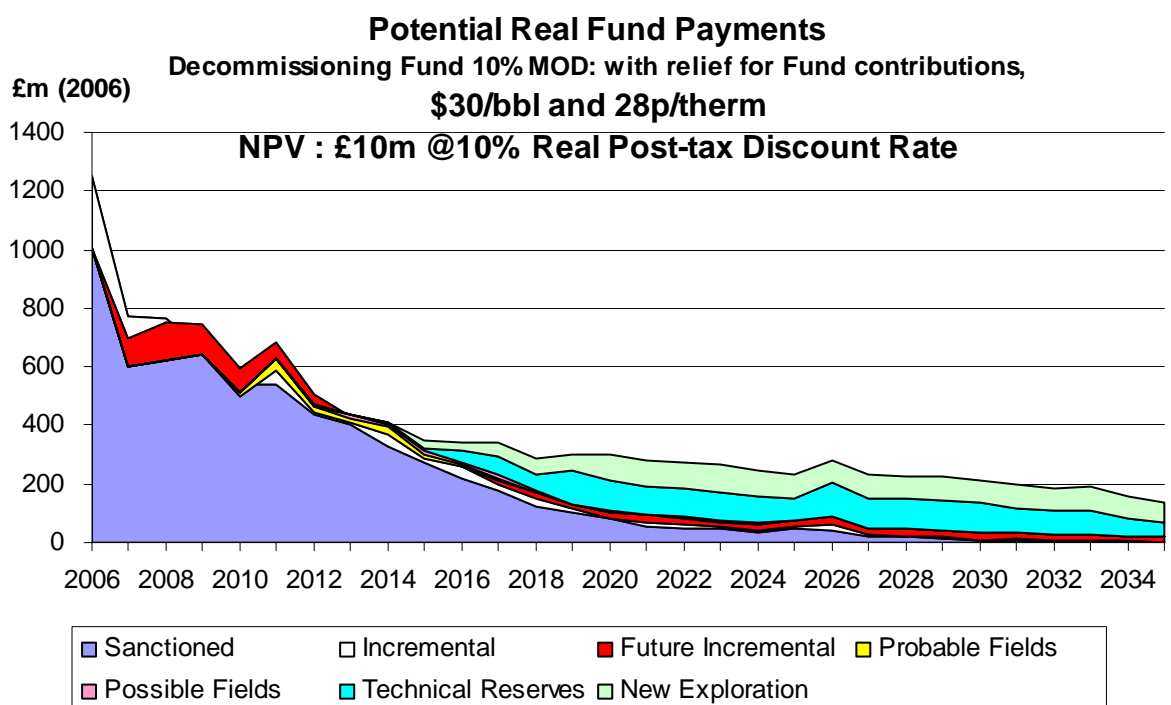
Chart 95 shows the potential Fund shortfall. It cumulates to £2142m in the period.

Chart 95

Potential Real Fund Shortfall
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
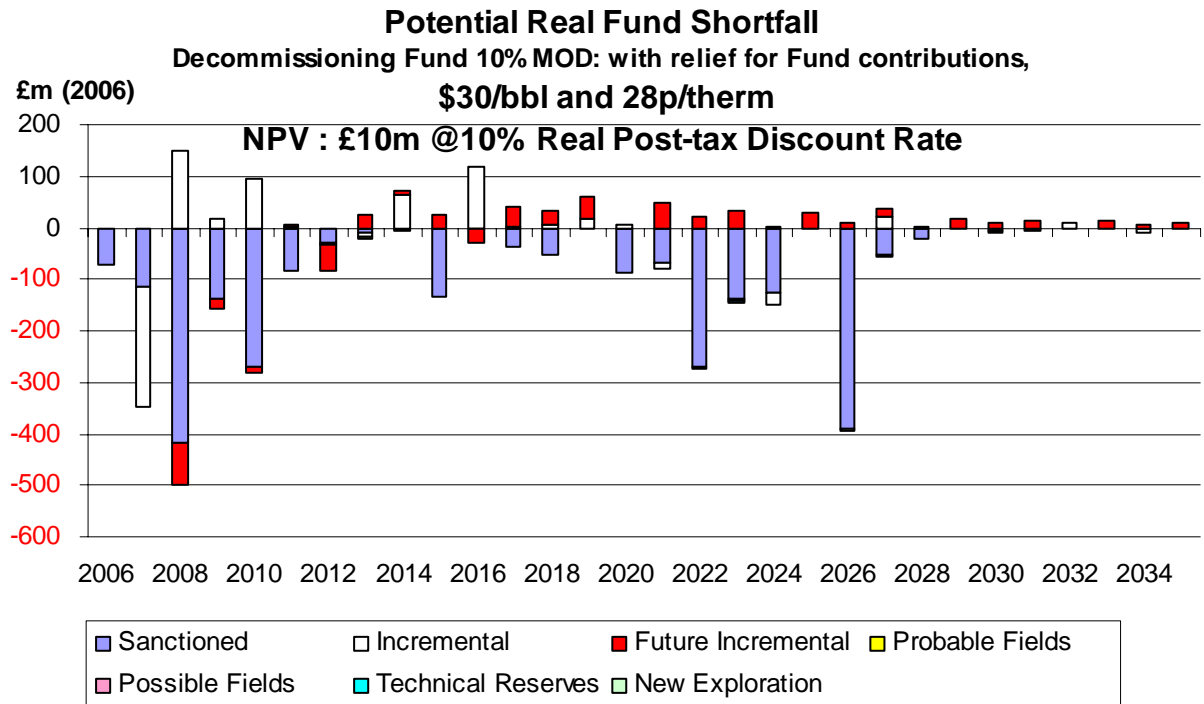
Chart 96 shows the change in operating costs which may occur with a Fund scheme under the medium price. The change in operating costs may cumulate to £2810m in the period to 2035.

Chart 96

Potential Change in Real Operating Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration
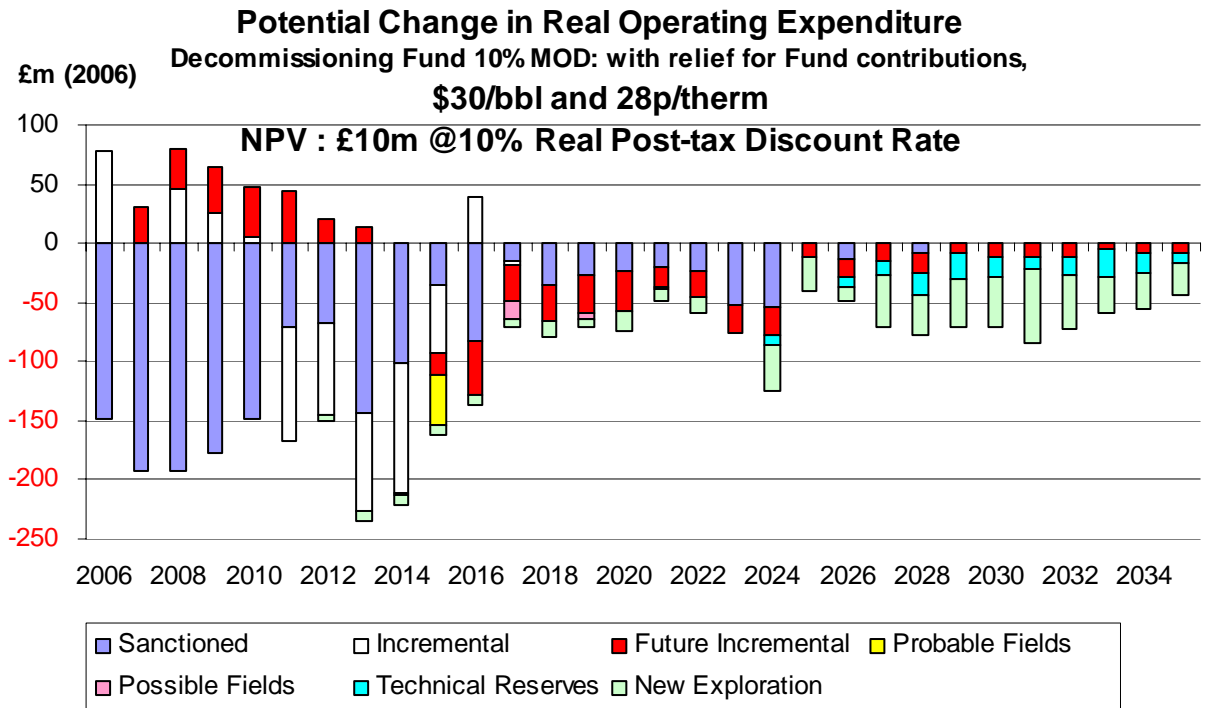
Chart 97 shows the equivalent development expenditure foregone which may cumulate to £916m.

Chart 97

Potential Change in Real Development Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned | Incremental | Future Incremental | Probable Fields | Possible Fields | Technical Reserves | New Exploration

81
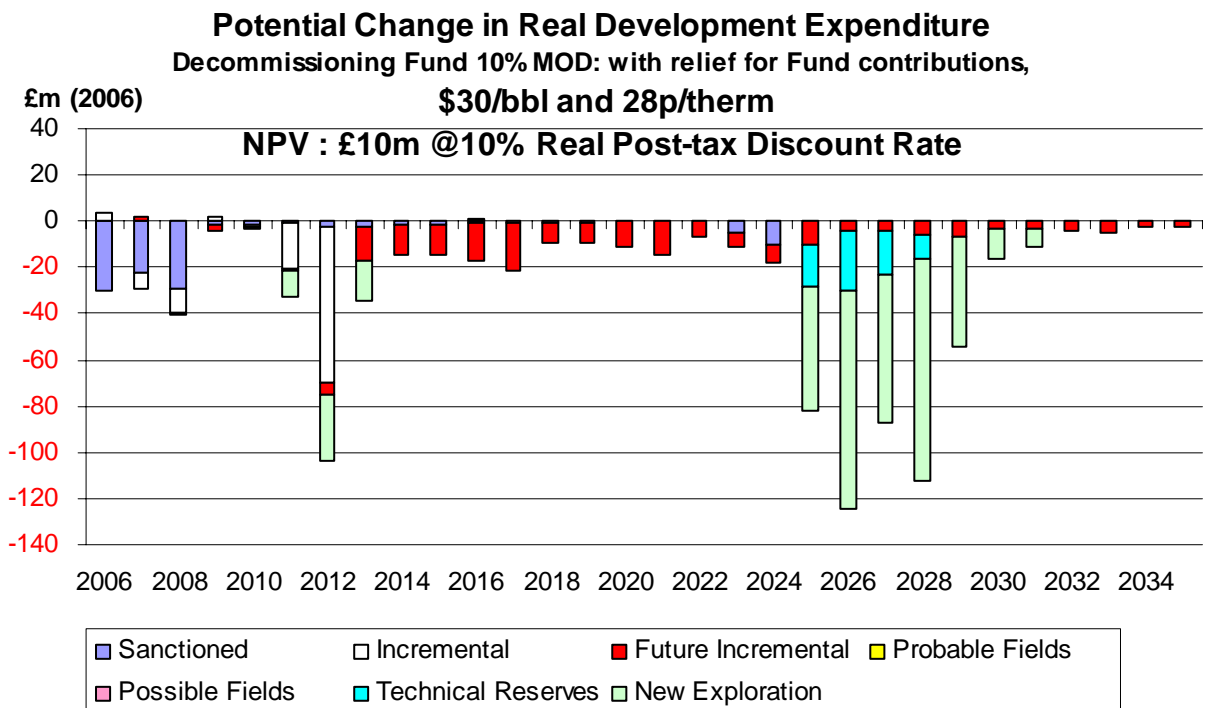
Chart 98 shows the corresponding potential production which may be foregone. This could cumulate to 360Mboe.

Chart 98

Potential Change in Production
Decommissioning Fund 10%MOD: with relief for Fund contributions, $30/bbl and 28p/therm
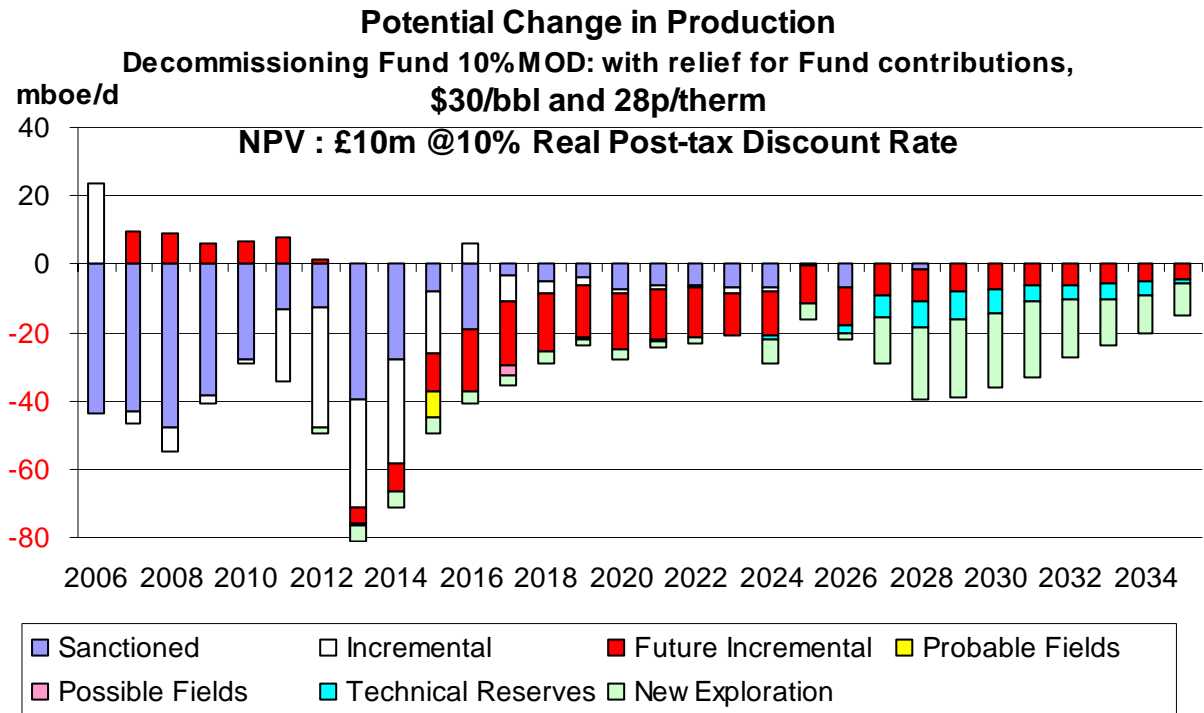
A substantial part of the reduction in investment and production was found to be due to the failure of projects to pass the economic hurdle following the introduction of the Fund.

Chart 99 shows the change in tax revenues (excluding the tax on interest) following the introduction of the Fund. This may cumulate to a reduction in tax revenue of £2639m in the period to 2035.

Chart 99

Potential Change in Real Tax Revenue
excluding effect of tax on interest
Decommissioning Fund 10%MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
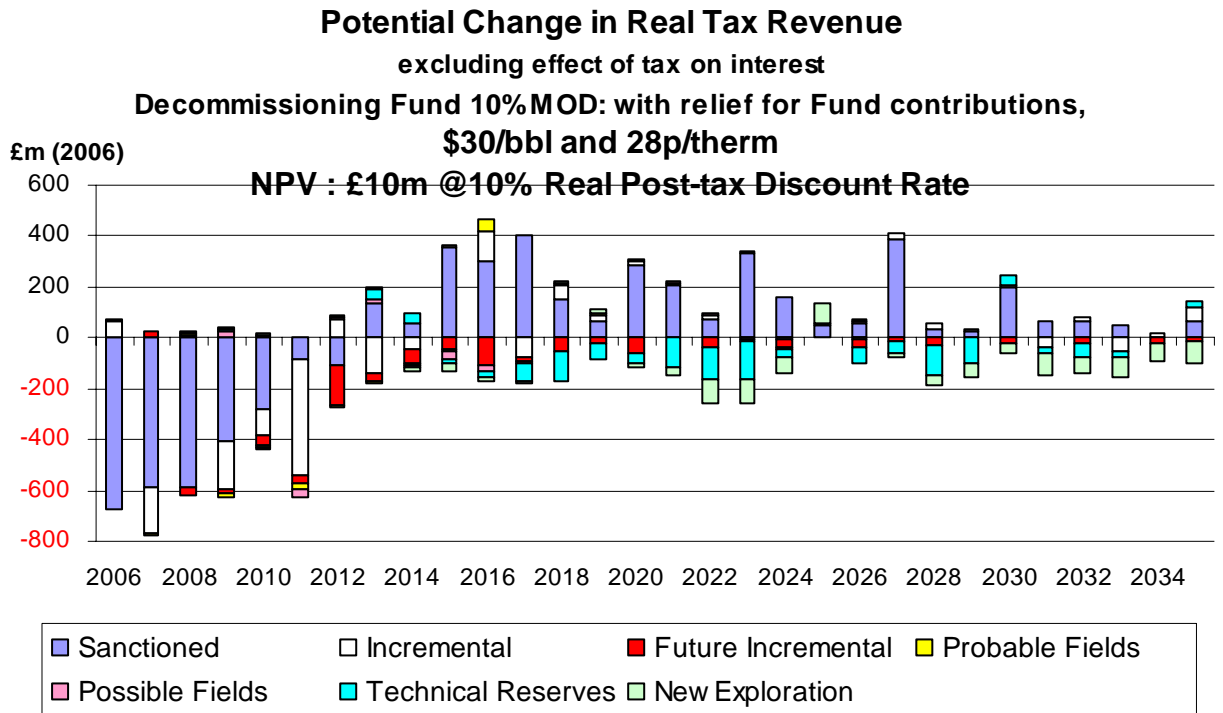
Chart 100 shows the change in tax revenues taking into account of the tax on interest. This may cumulate to an increase in tax revenues of £106m in the period.

Chart 100

Potential Change in Real Tax Revenue
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
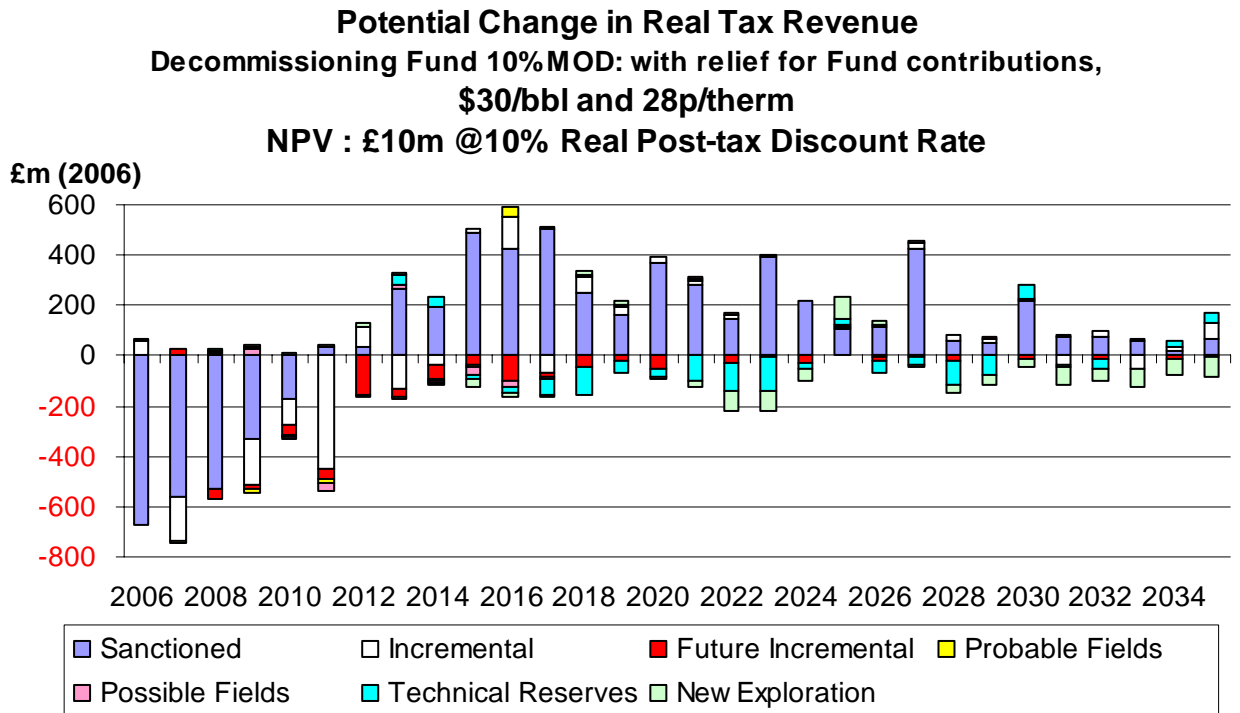
Chart 101 shows the potential decommissioning costs where the Fund earns income of 10% under the $40, 36 pence case. The decommissioning costs cumulate to £15047m in the period to 2035.

Chart 101

Potential Real Decommissioning Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
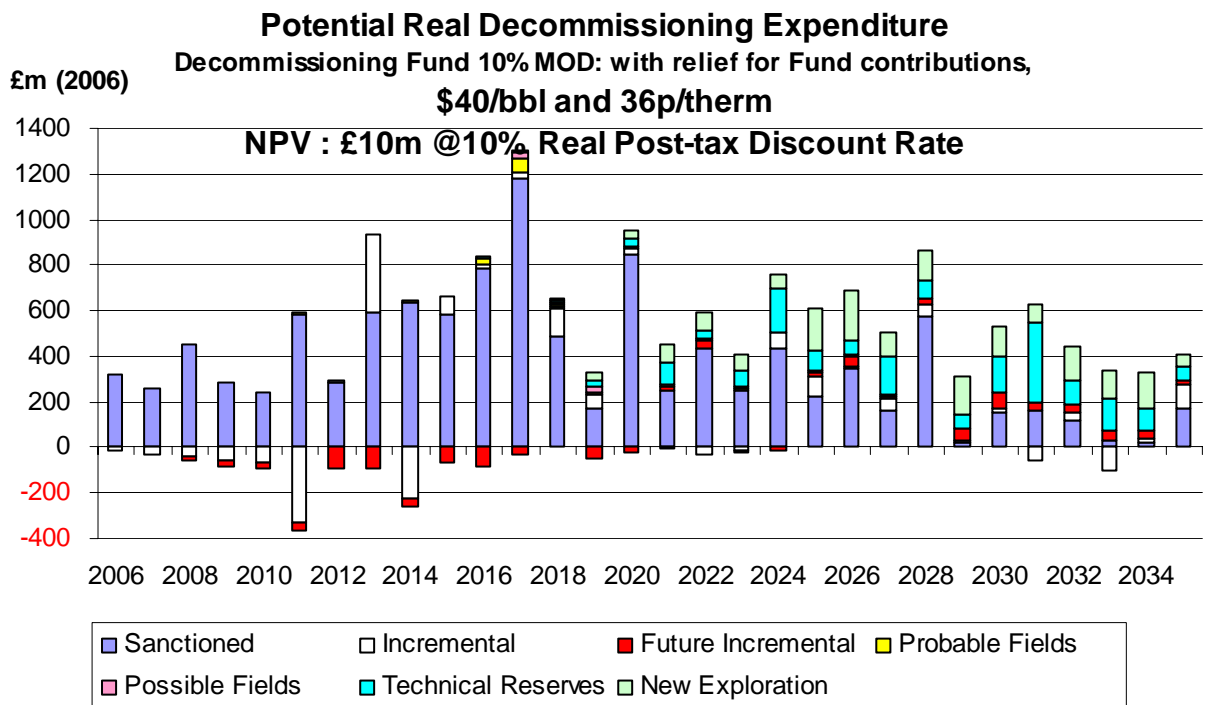
Chart 102 shows the decommissioning relief. It cumulates to £8149m in the period to 2035.

Chart 102

Potential Real Decommissioning Relief
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
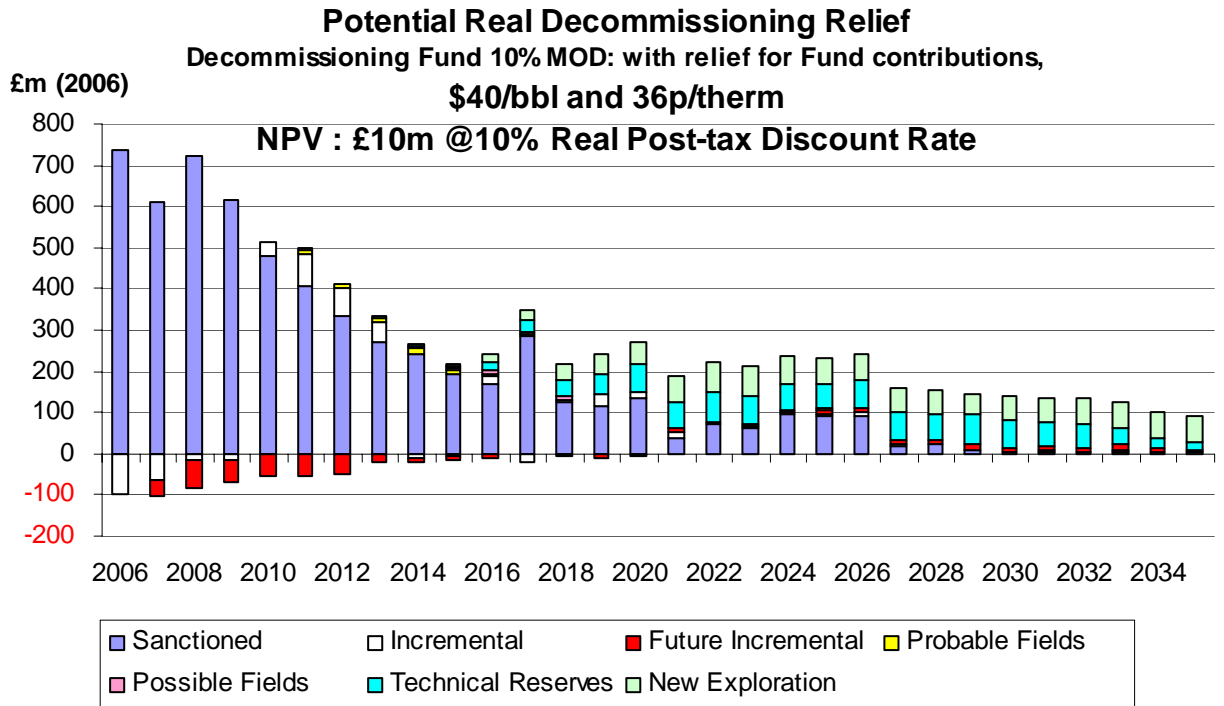
Chart 103 shows the tax on the Fund income. The tax revenues cumulate to £2949m in the period to 2035.

Chart 103

Potential Real Tax on Interest
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
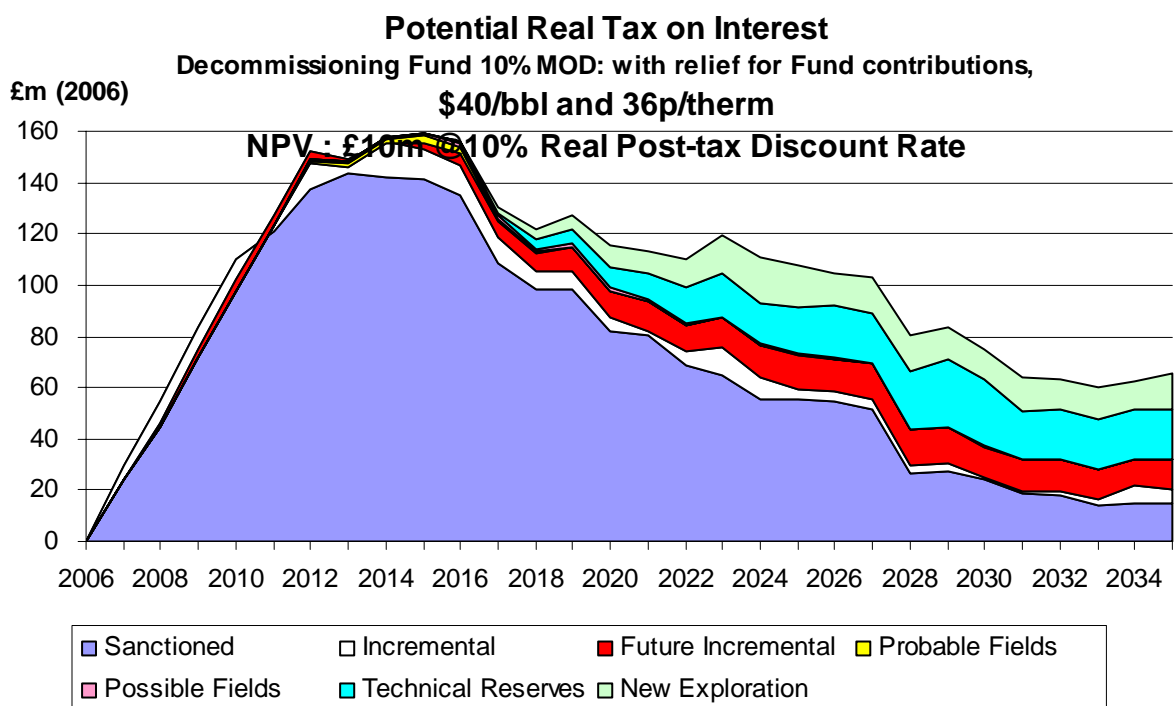
Chart 104 shows the real Fund payments paid by the operators. These cumulate to £12795m in the period to 2035.

Chart 104
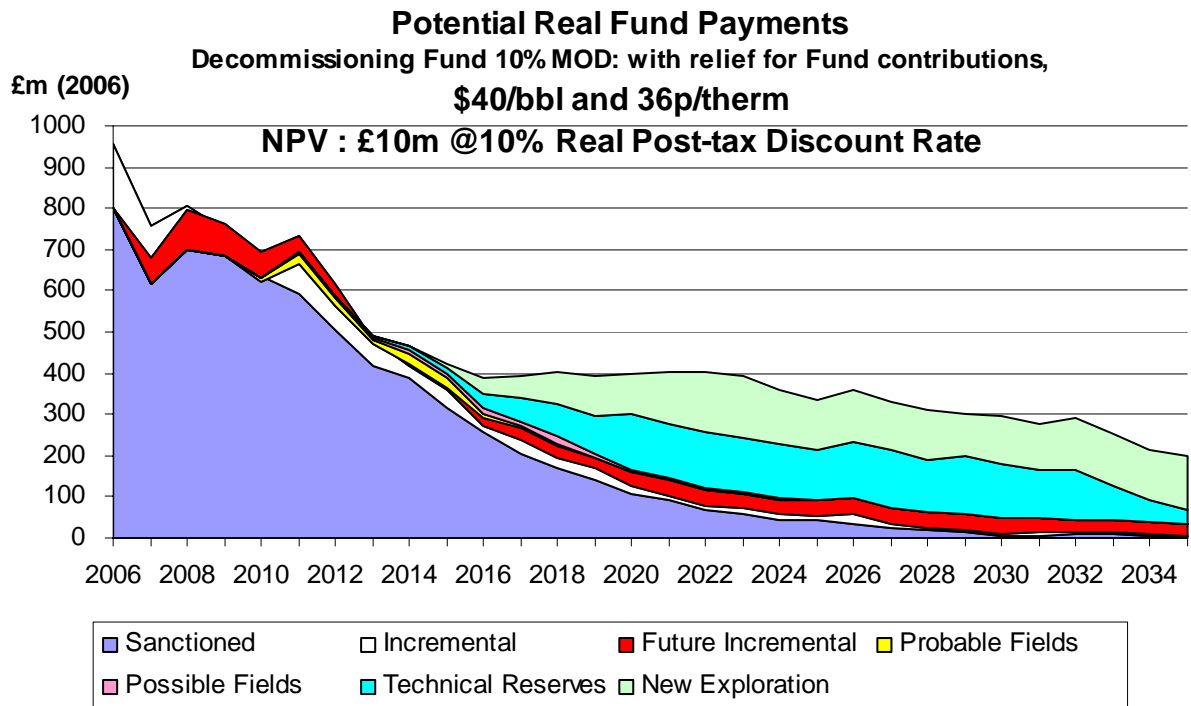
Chart 105 shows the potential Fund shortfall. It cumulates to £1028m in the period to 2035.

Chart 105
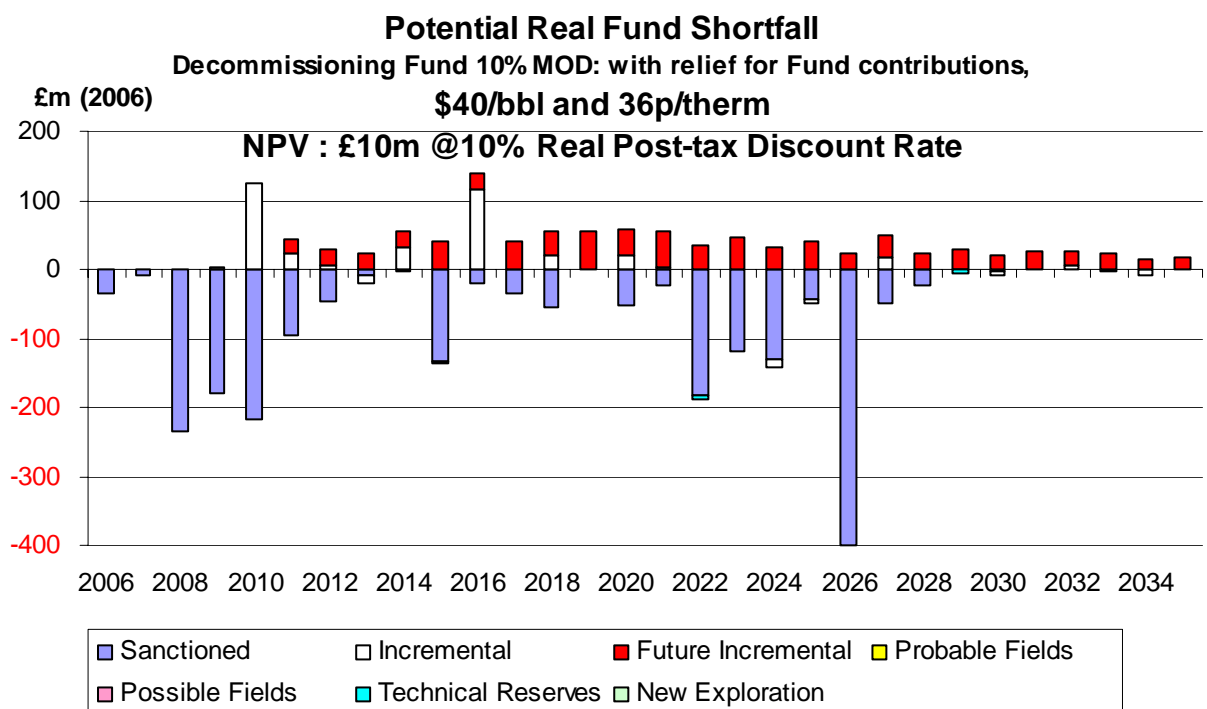
Chart 106 shows the change in operating costs. It cumulates to £1757 in the period to 2035.

Chart 106

Potential Change in Real Operating Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
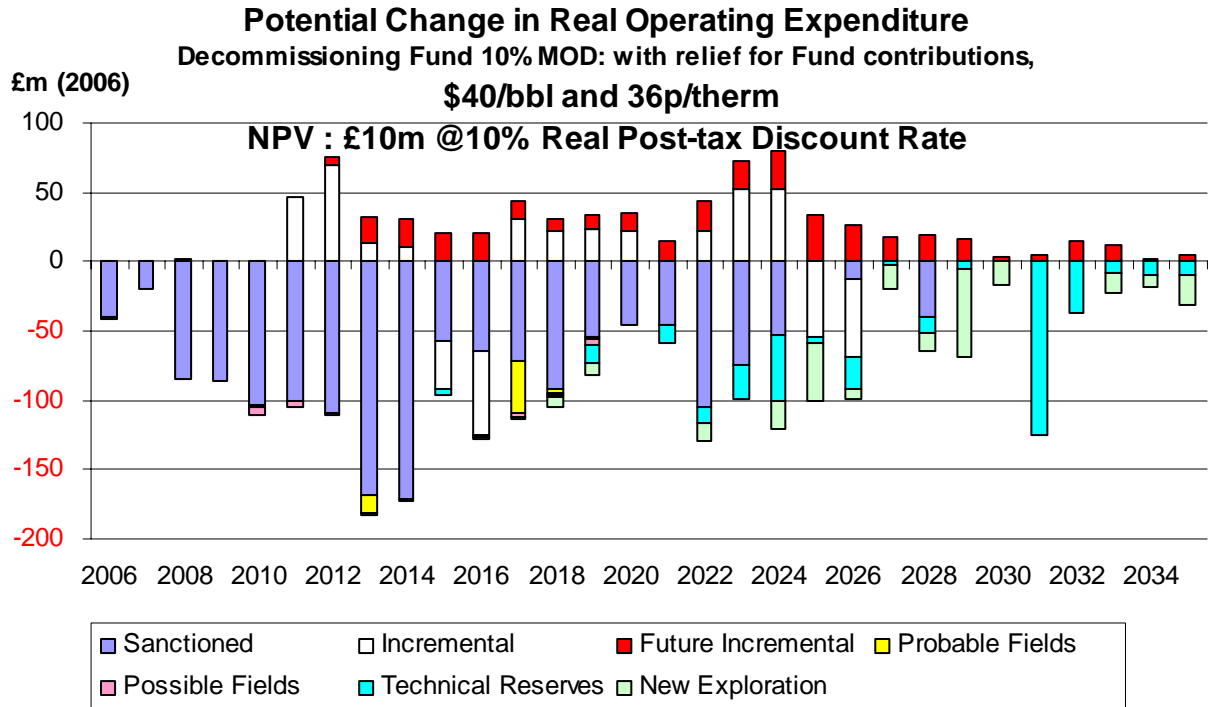
Chart 107 shows the change in development expenditures. They cumulate to £460m.

Chart 107

Potential Change in Real Development Expenditure
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
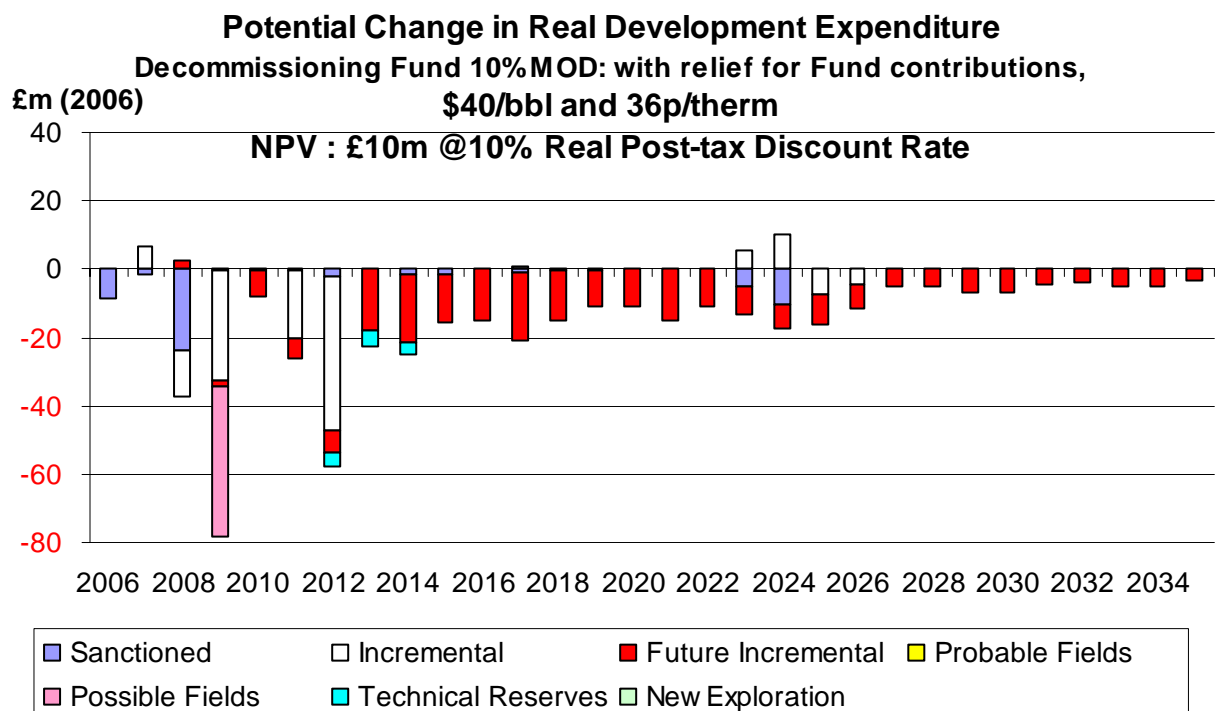
Chart 108 shows the corresponding loss of production. It cumulates to 260Mboe.

Chart 108

Potential Change in Production
Decommissioning Fund 10%MOD: with relief for Fund contributions, $40/bbl and 36p/therm
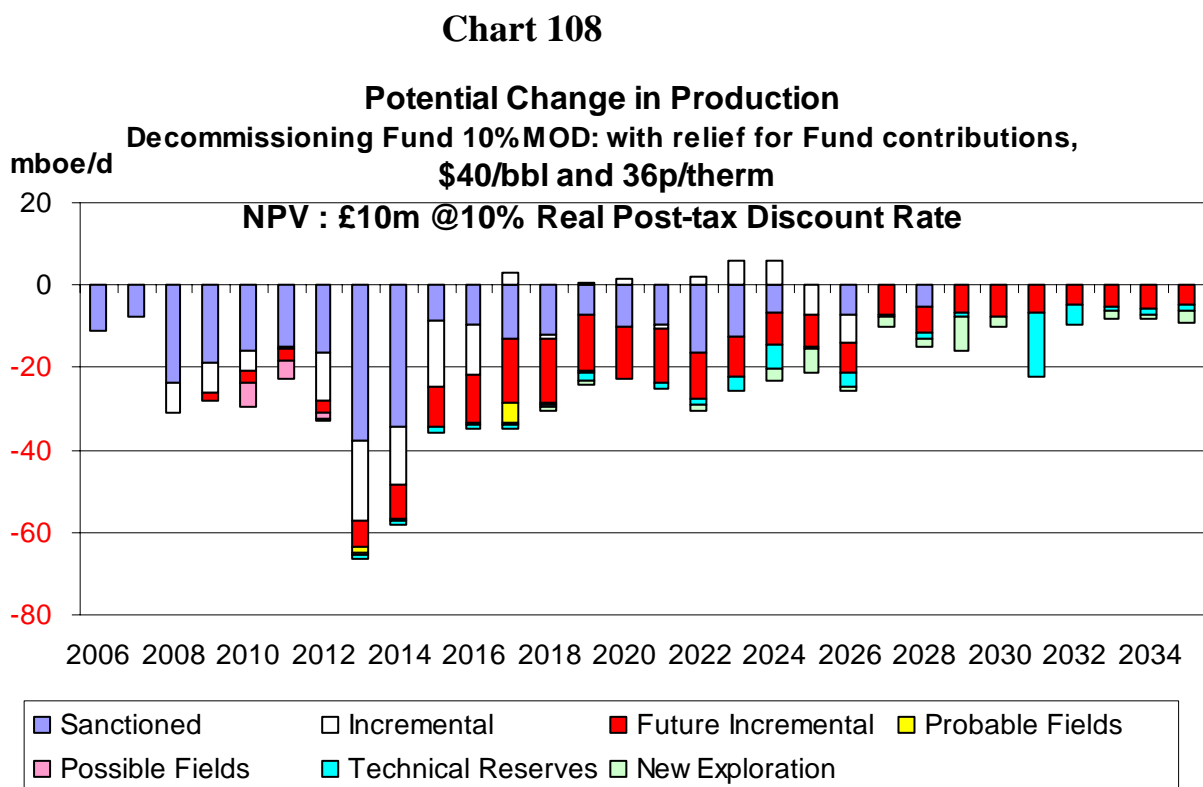
It was found that a moderate element of the reduction in production was due to projects failing to pass the economic hurdle as a consequence of the introduction of the Fund.

Chart 109 shows the change in tax revenue (excluding the tax on interest) following the introduction of the Fund scheme. This cumulates to a reduction in tax revenue of £1239m in the period to 2035.

Chart 109

Potential Change in Real Tax Revenue
excluding effect of tax on interest
Decommissioning Fund 10%MOD: with relief for Fund contributions, $40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
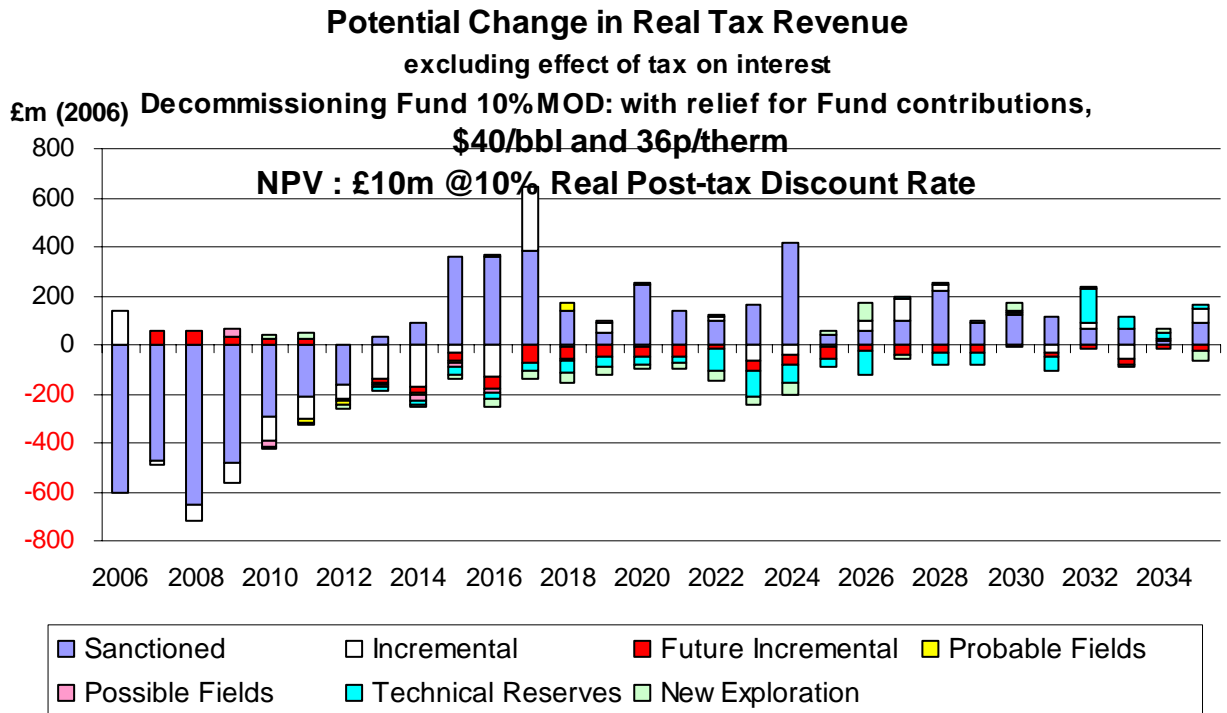
Chart 110 shows the change in tax revenue taking account the tax on the Funds income. The total cumulates to an increase in tax revenue of £1710m in the period to 2035 when the tax on interest is included.

Chart 110

Potential Change in Real Tax Revenue
Decommissioning Fund 10% MOD: with relief for Fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
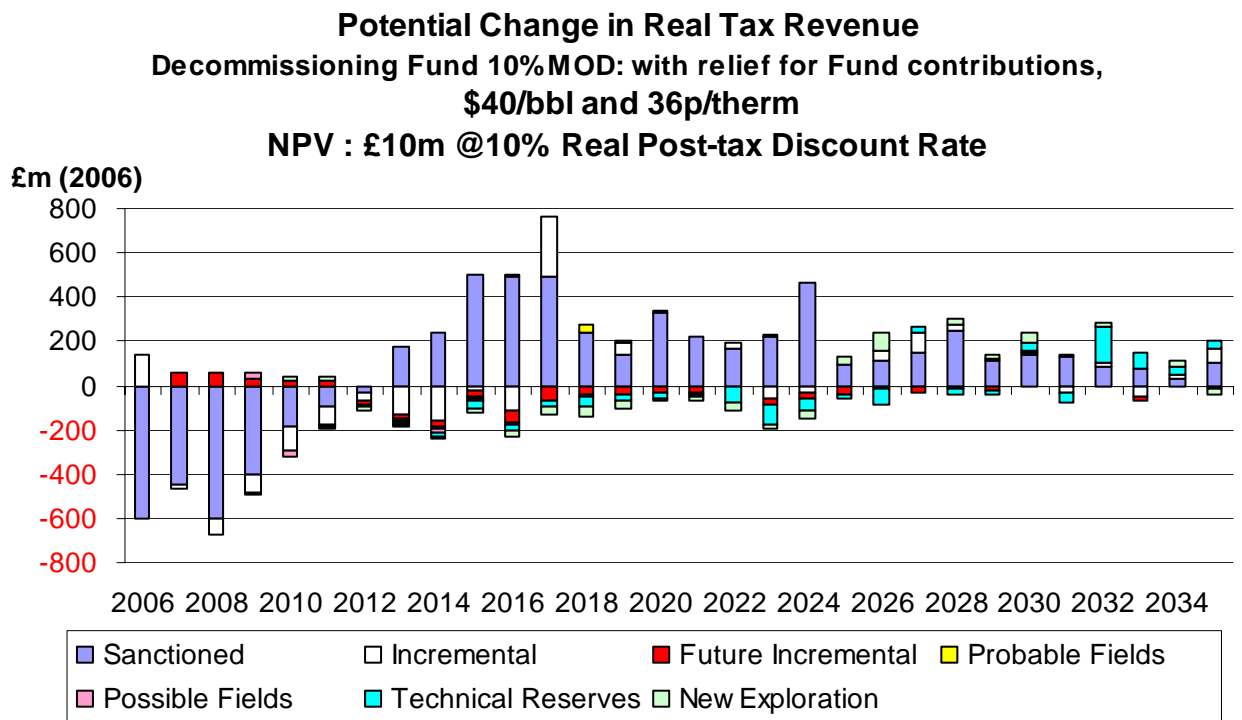
Fund 4

The 4th Fund scenario assumes Fund income of 4.75% and, as in the 3rd Fund scenario, the Fund payments may result in acceleration of the decommissioning date.

Chart 111 shows the potential decommissioning costs with a Fund scheme paying gross interest of 4.75% under the $30, 28 pence price. The decommissioning costs cumulate to £13368m in the period to 2035.

Chart 111

Potential Real Decommissioning Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves ■ New Exploration
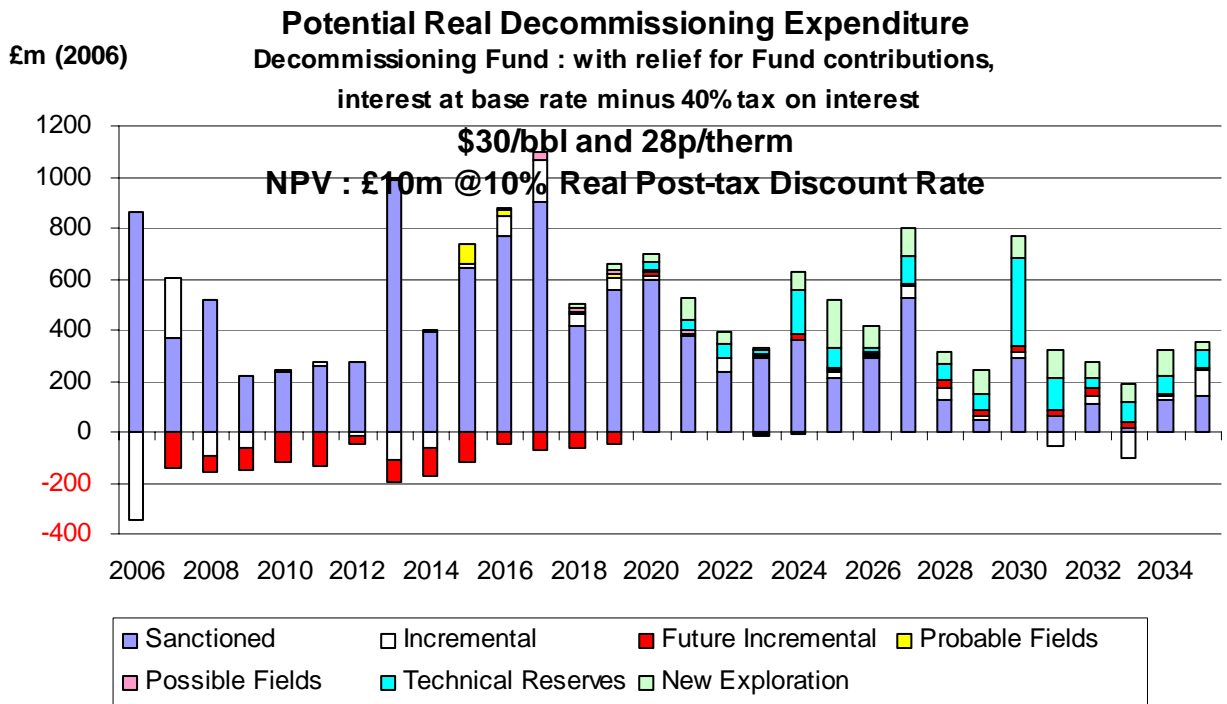
Chart 112 shows the decommissioning relief. The total cumulates to £8632m in the period to 2035.

Chart 112

Potential Real Decommissioning Relief
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves ■ New Exploration
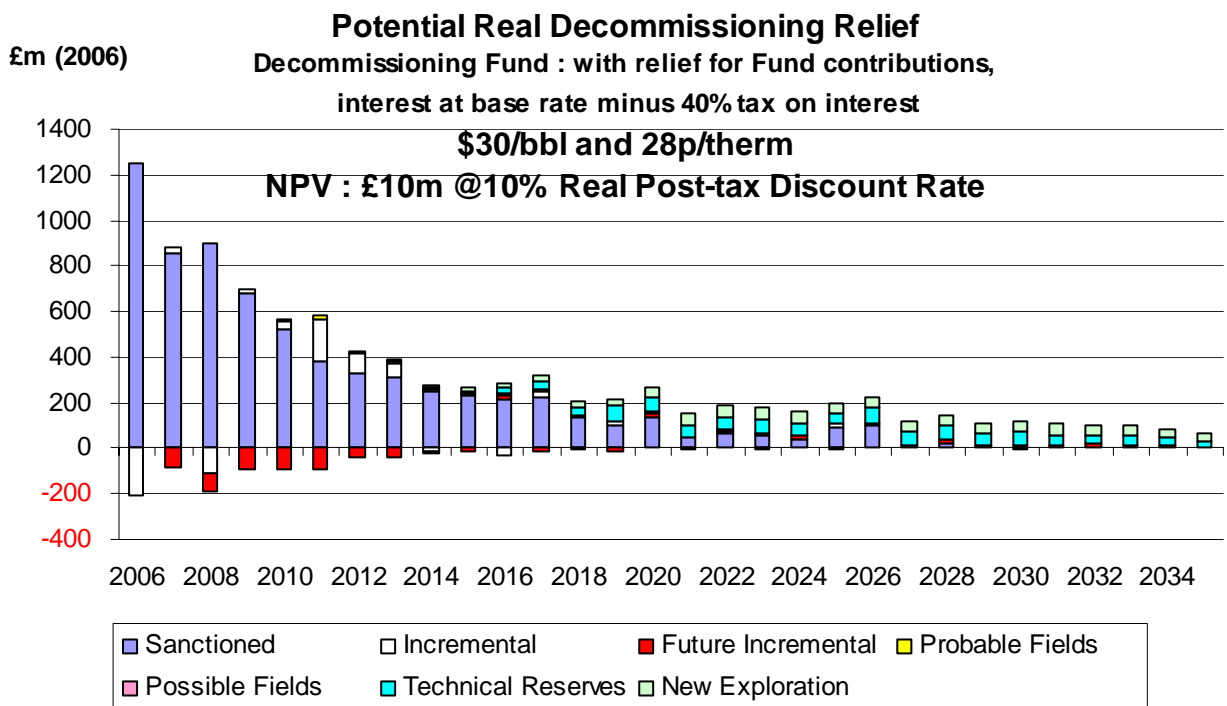
Chart 113 shows the tax on the Fund income. The total tax on the interest cumulates to £1550m in the period to 2035.

Chart 113

Potential Real Tax on Interest
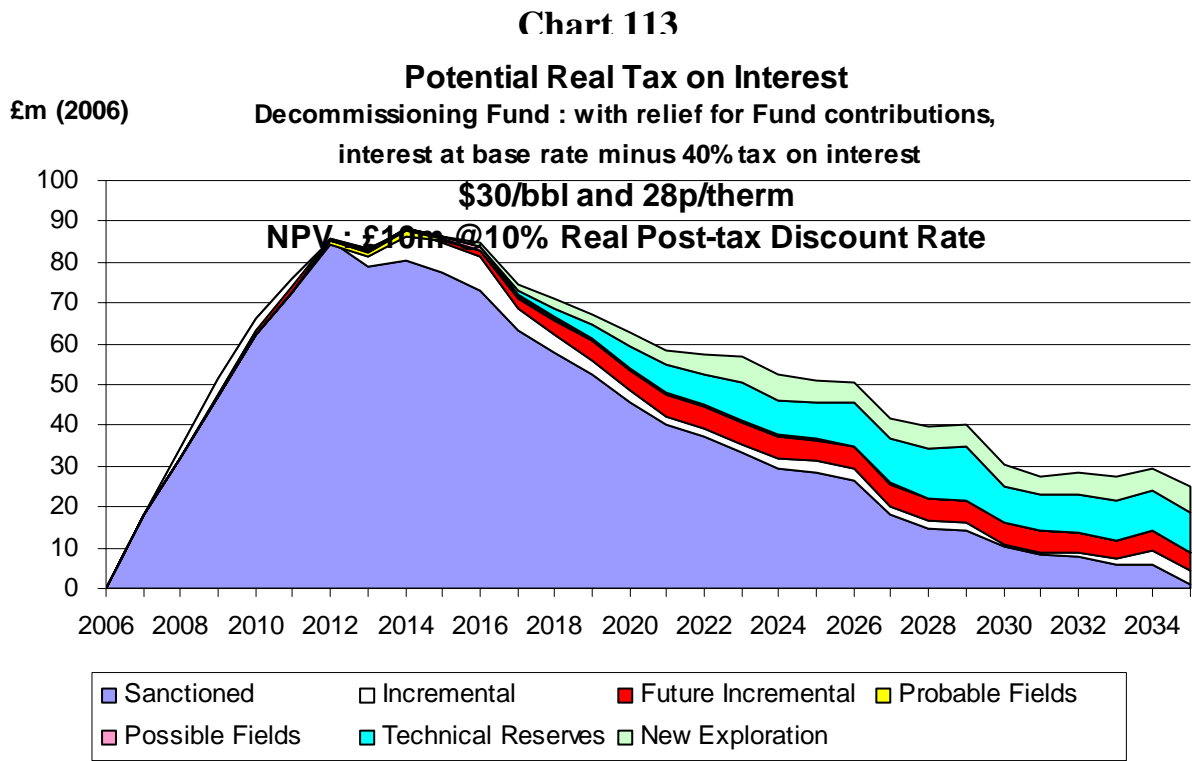
Chart 114 shows the real Fund contributions paid by the operators under the medium price. These cumulate to £12625m in the period to 2035.

Chart 114

Potential Real Fund Payments
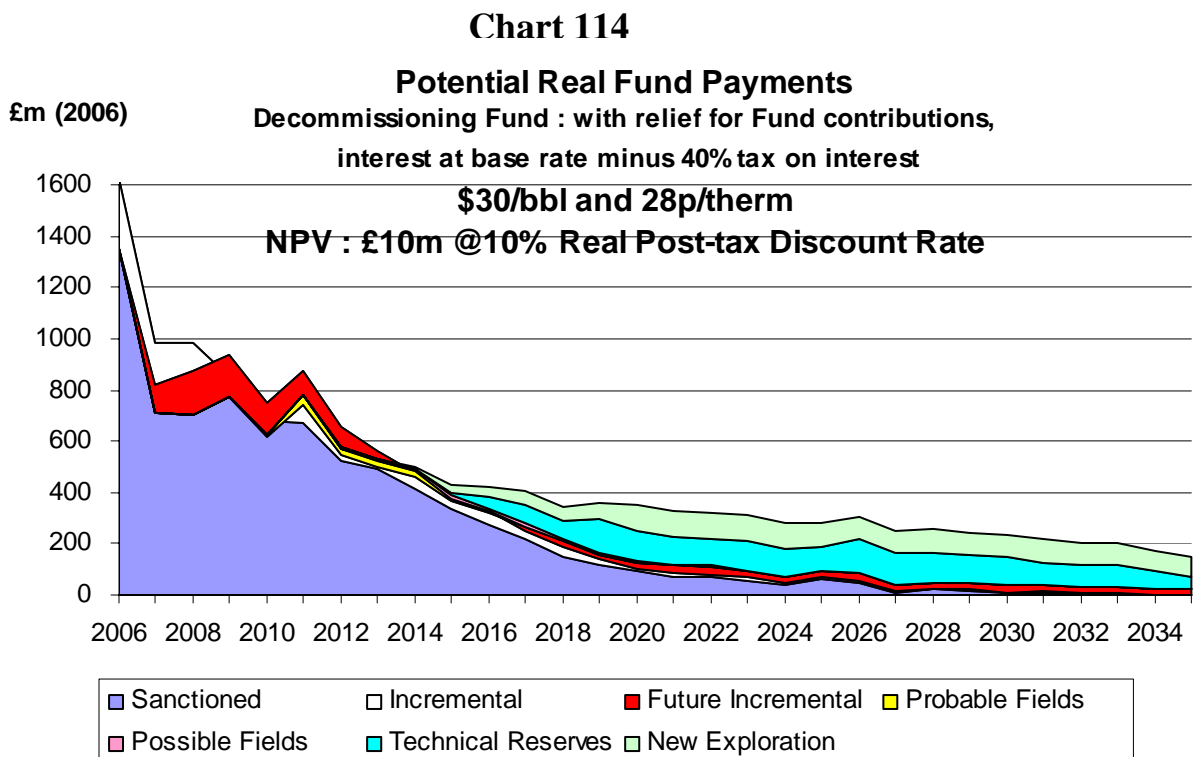
Chart 115 shows the potential Fund shortfall under the medium price. The shortfall may cumulate to £2105m in the period to 2035.

Chart 115

Potential Real Fund Shortfall
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
**NPV : £10m @10% Real Post-tax Discount Rate**
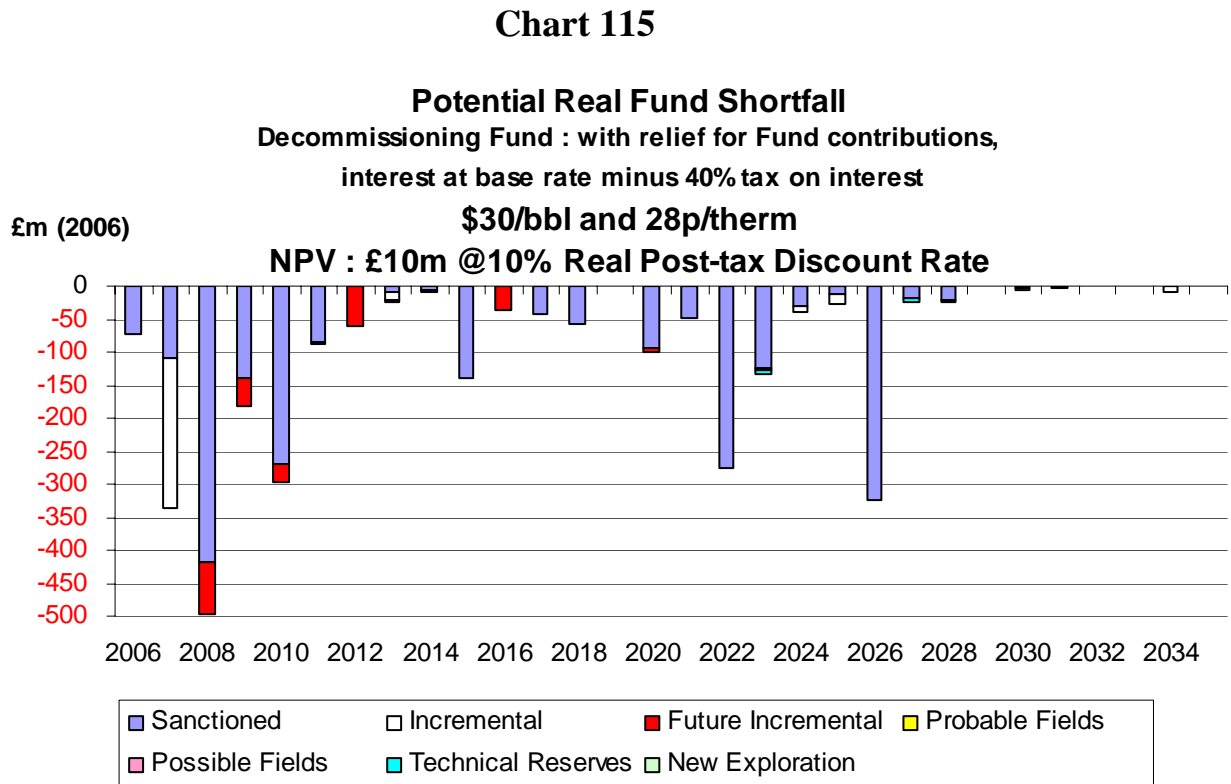
Chart 116 shows the change in operating costs. The total may cumulate to £3169m in the period to 2035.

Chart 116

Potential Change in Real Operating Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
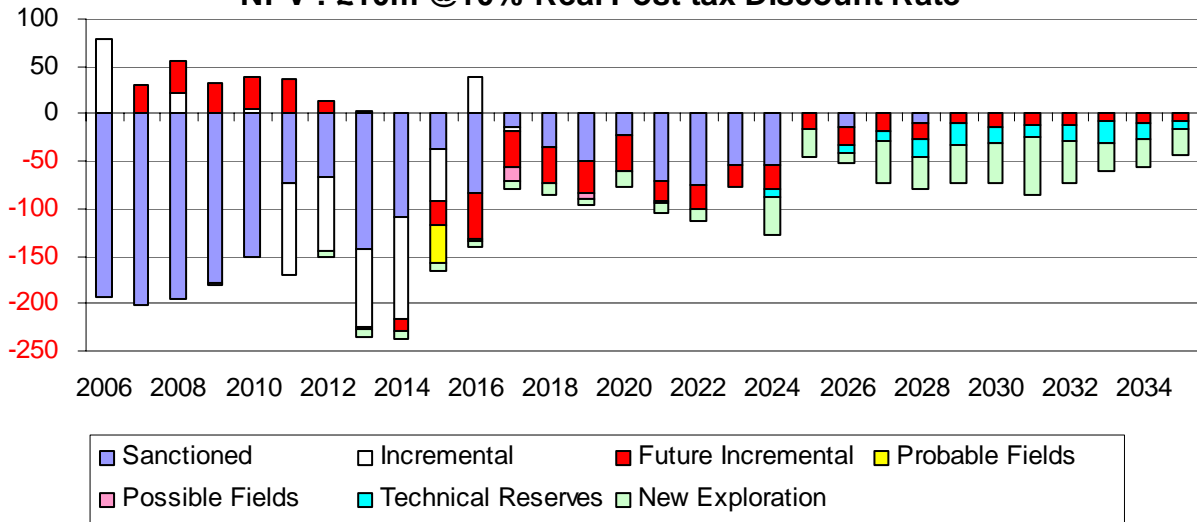
Chart 117 shows the corresponding development expenditure. It cumulates to £911m.

Chart 117

Potential Change in Real Development Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
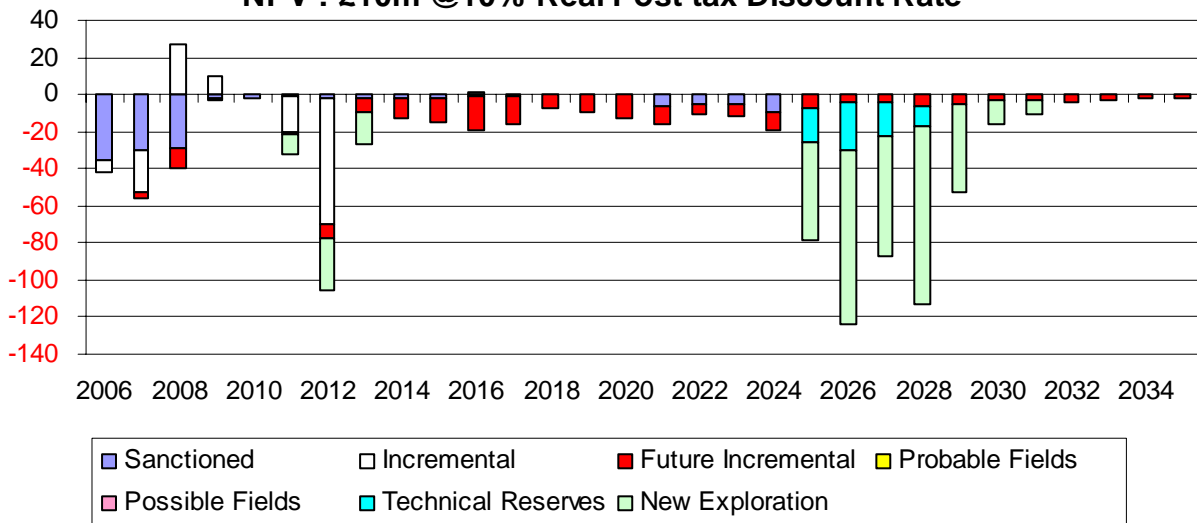
Chart 118 shows the corresponding change in production. It could cumulate to 358Mboe.

Chart 118

Potential Change in Production
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40%tax on interest
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
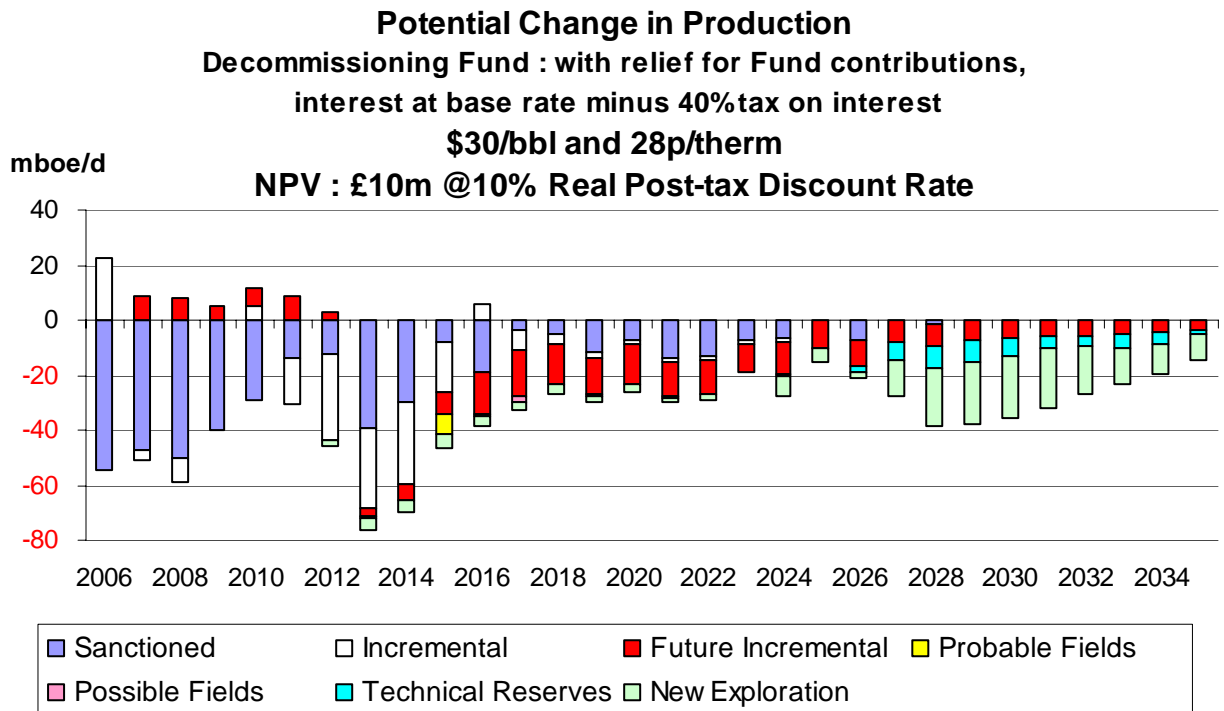
Only a modest part of the loss of production was found to be due to the failure of projects to pass the economic hurdle following the introduction of the Fund.

Chart 119 shows the change in tax revenue (excluding the tax on interest. This cumulates to a reduction of £3303m in the period to 2035.

Chart 119

Potential Change in Real Tax Revenue
(excludes effect of tax on interest)
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
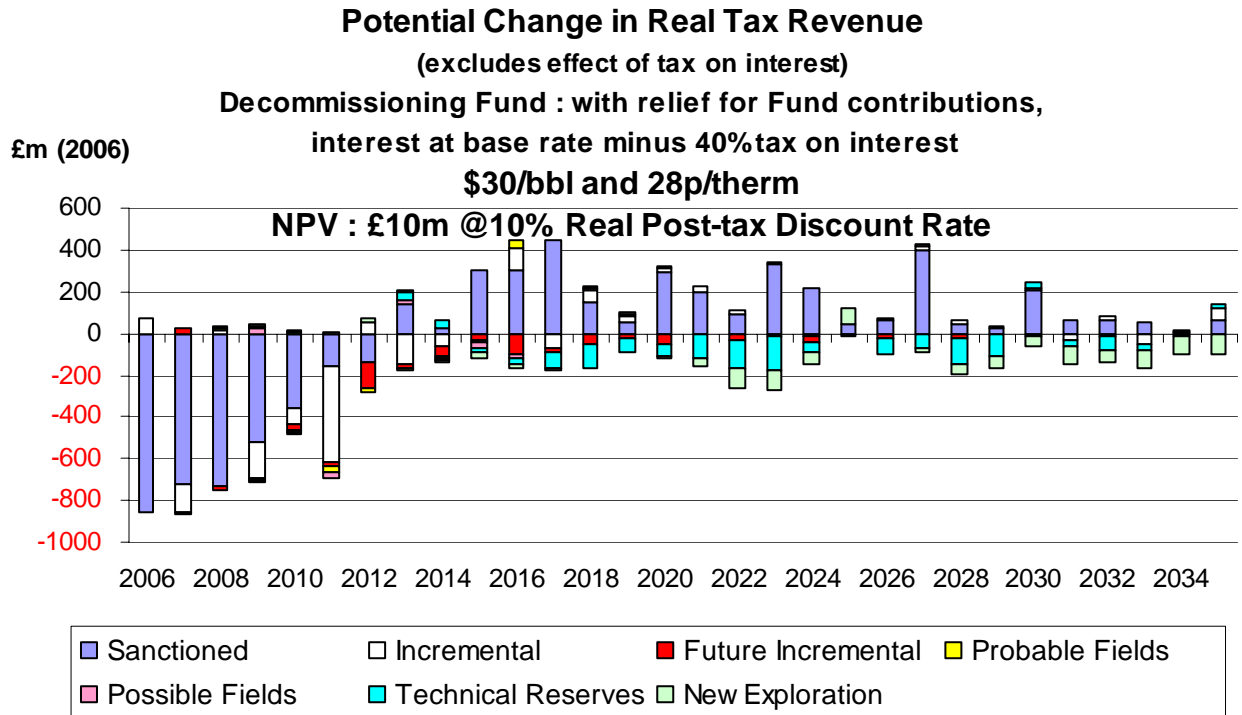
Chart 120 shows the change in tax revenue taking into account the tax on interest. The total cumulates to a decrease in tax revenue of £1753m in the period.

Chart 120

Potential Change in Real Tax Revenue
Decommissioning Fund : with relief for Fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
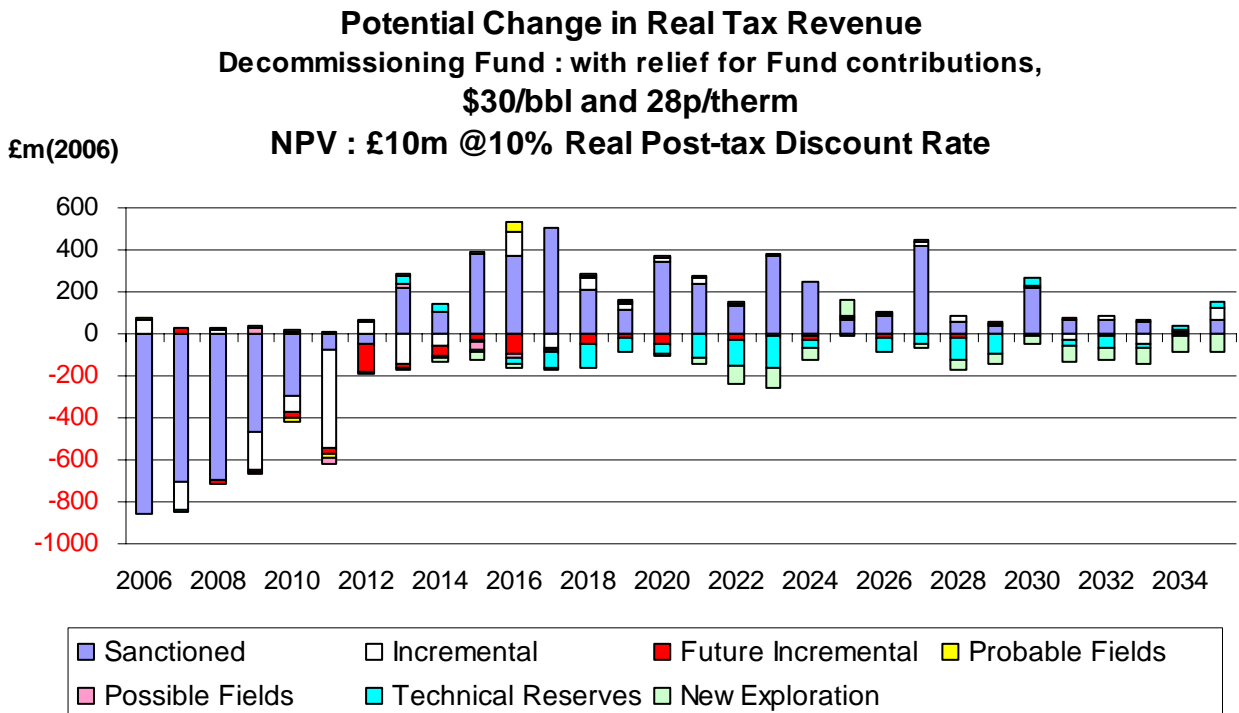
The position under the $40, 36 pence price is now examined. Chart 121 shows the decommissioning costs. The total may cumulate to £15058m in the period.

Chart 121

Potential Real Decommissioning Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
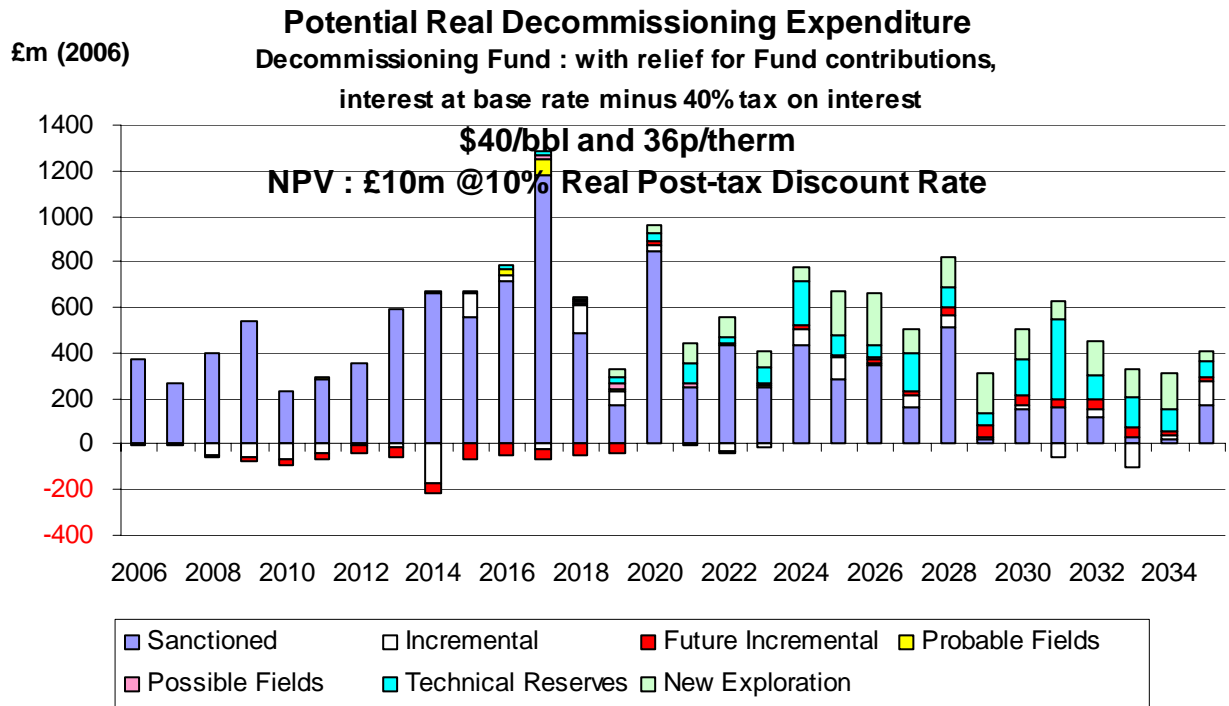
Chart 122 shows the decommissioning relief. It cumulates to £9742m in the period.

Chart 122

Potential Real Decommissioning Relief
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
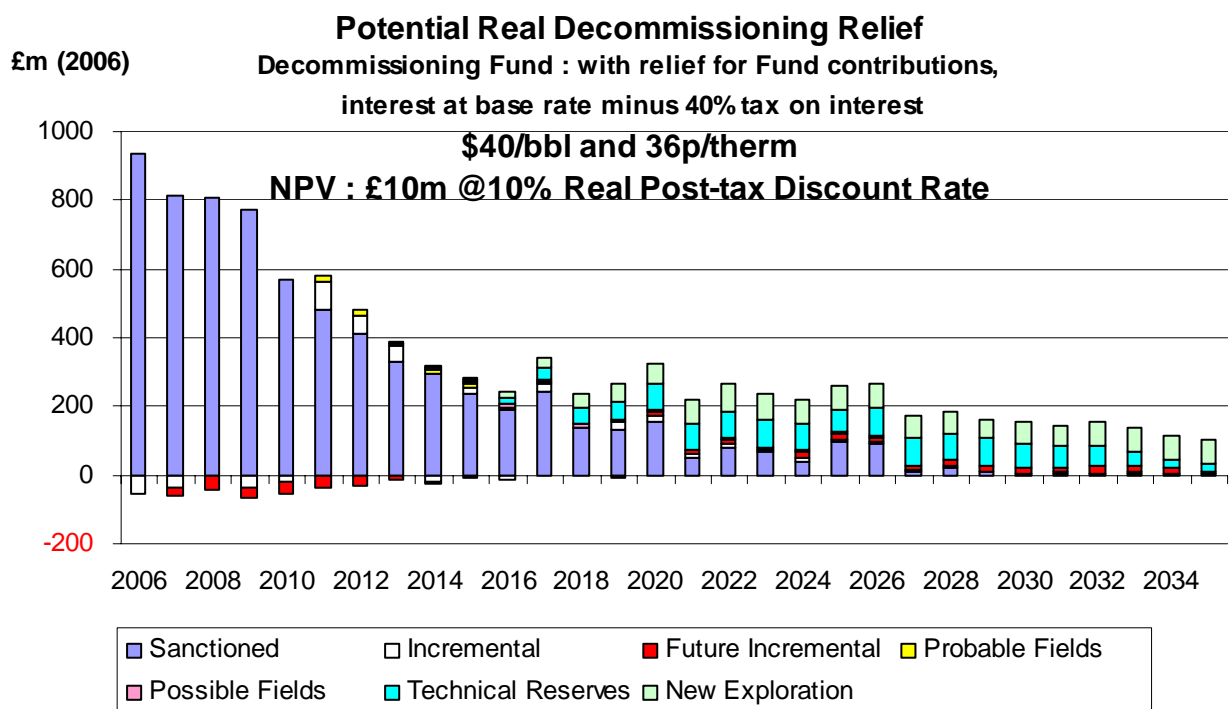
Chart 123 shows the tax on the Fund interest. The total tax on the interest cumulates to £1654m in the period.

Chart 123

Potential Real Tax on Interest

£m (2006)

Decommissioning Fund : with relief for Fund contributions, interest at base rate minus 40% tax on interest

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
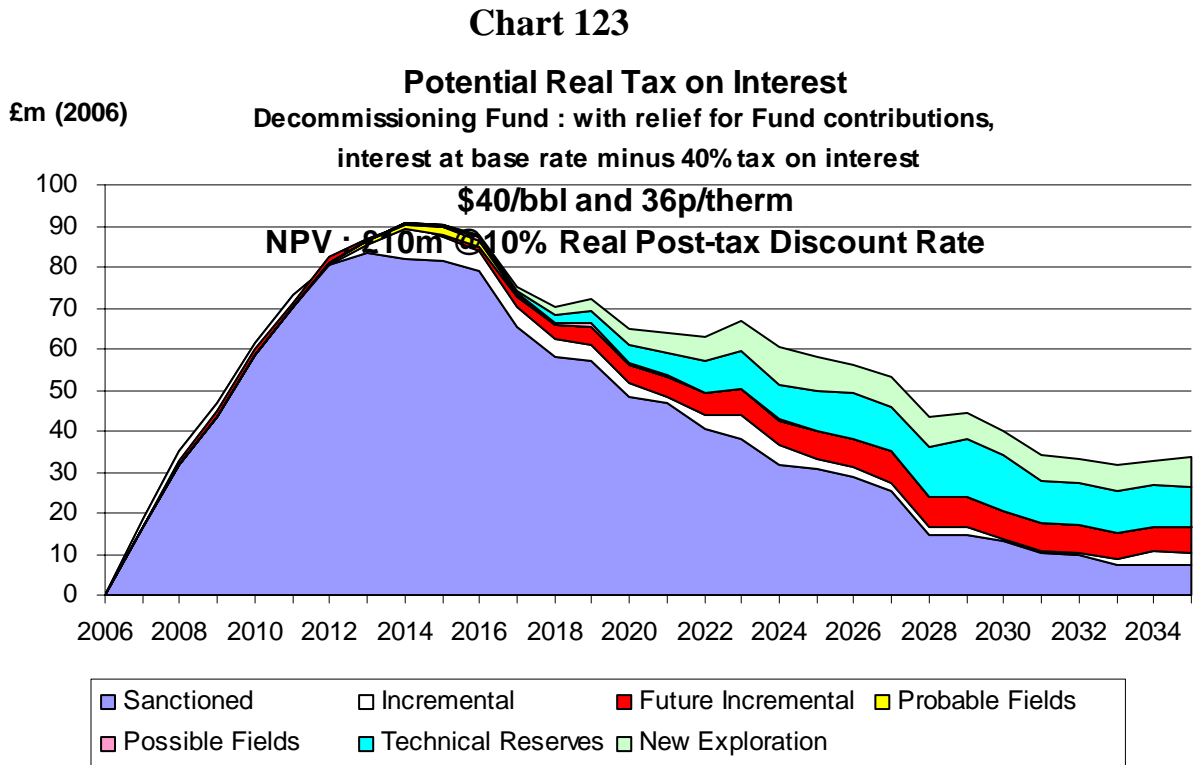
Chart 124 shows the Fund contributions paid. They cumulate to £15097m in the period.

Chart 124

Potential Real Fund Payments

£m (2006)

Decommissioning Fund : with relief for Fund contributions, interest at base rate minus 40% tax on interest

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
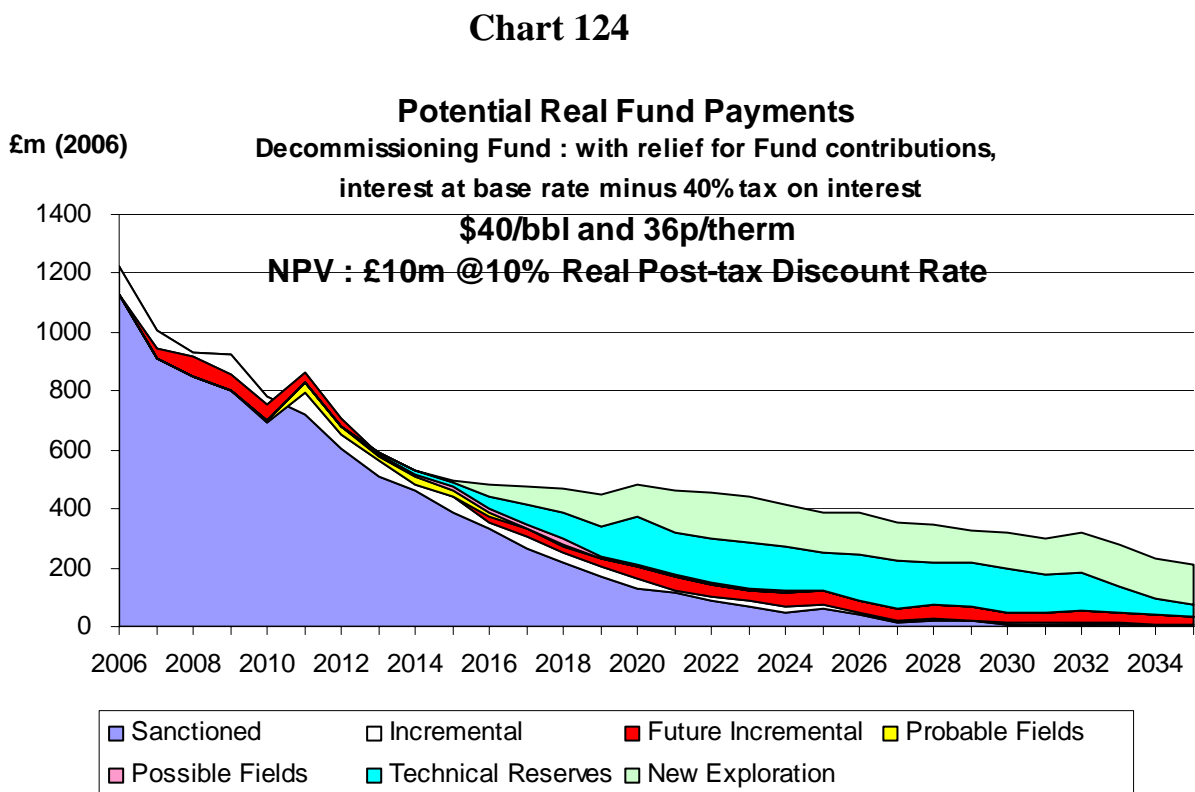
Chart 125 shows the potential Fund shortfall under the medium price. The shortfall may cumulate to £1293m in the period to 2035.

Chart 125

Potential Real Fund Shortfall
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
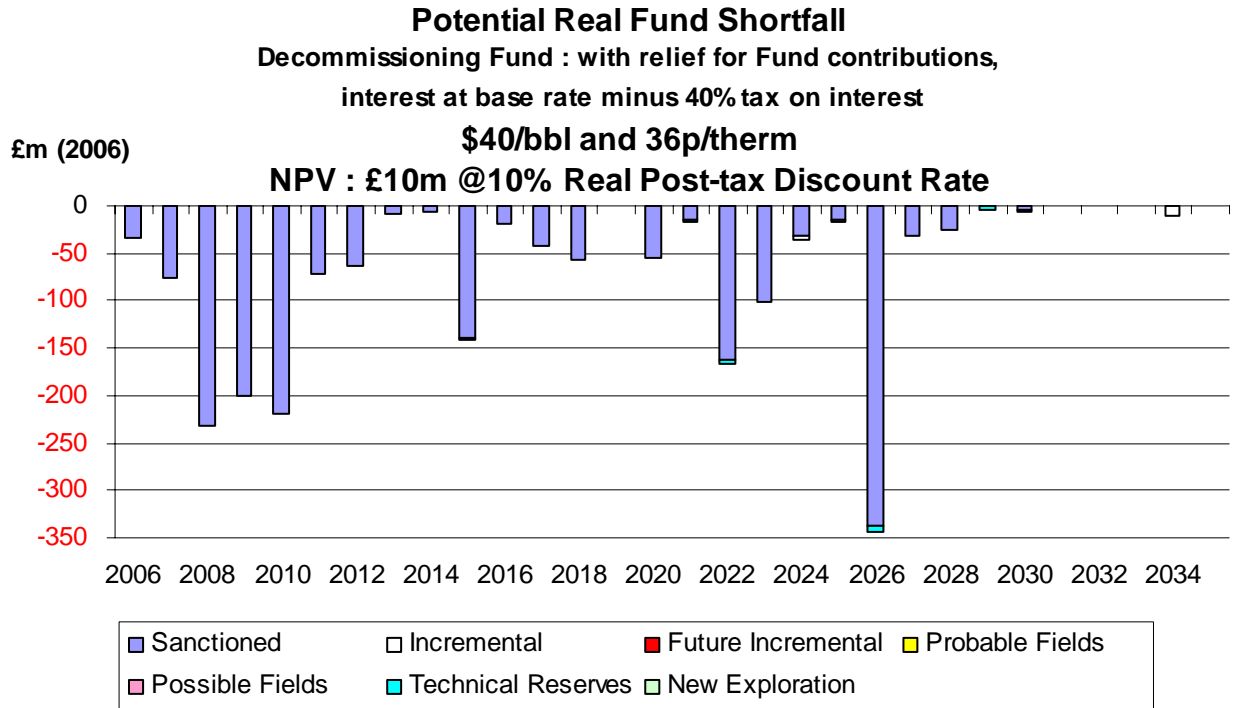
Chart 126 shows the change in operating costs. It cumulates to £2356 in the period to 2035.

Chart 126

Potential Change in Real Operating Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
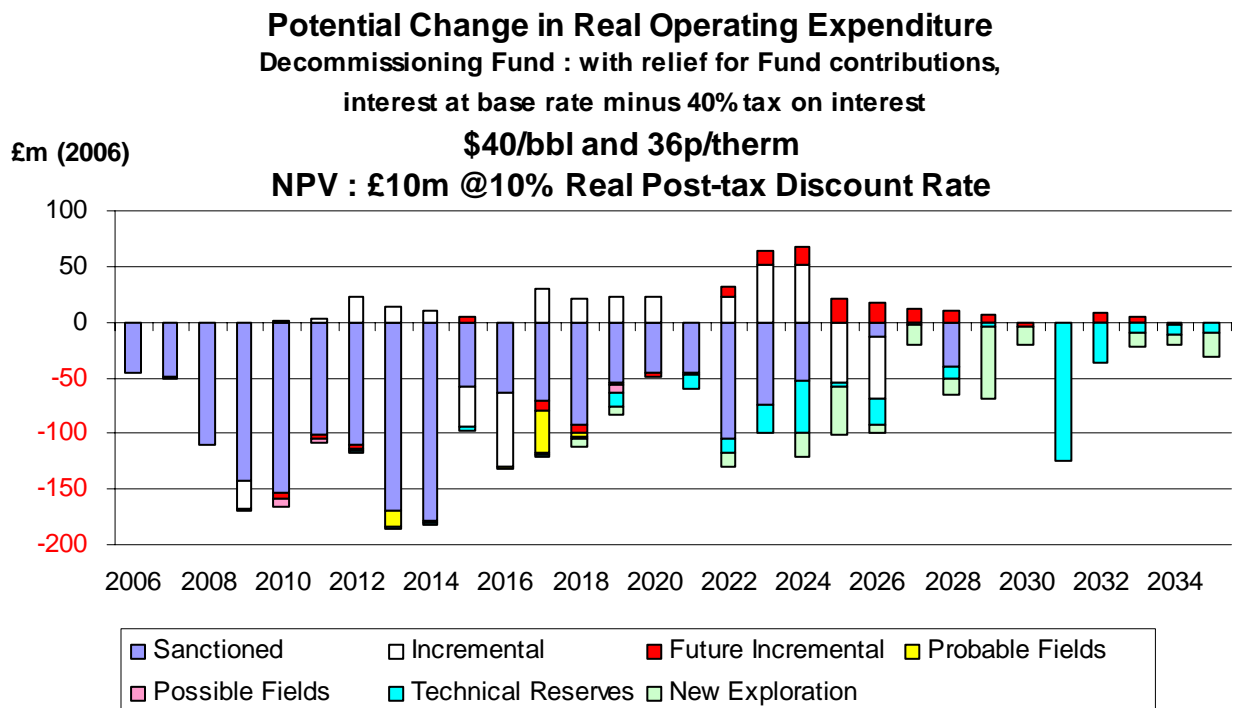
Chart 127 shows the corresponding change in development expenditure. It cumulates to £877m.

Chart 127

Potential Change in Real Development Expenditure
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
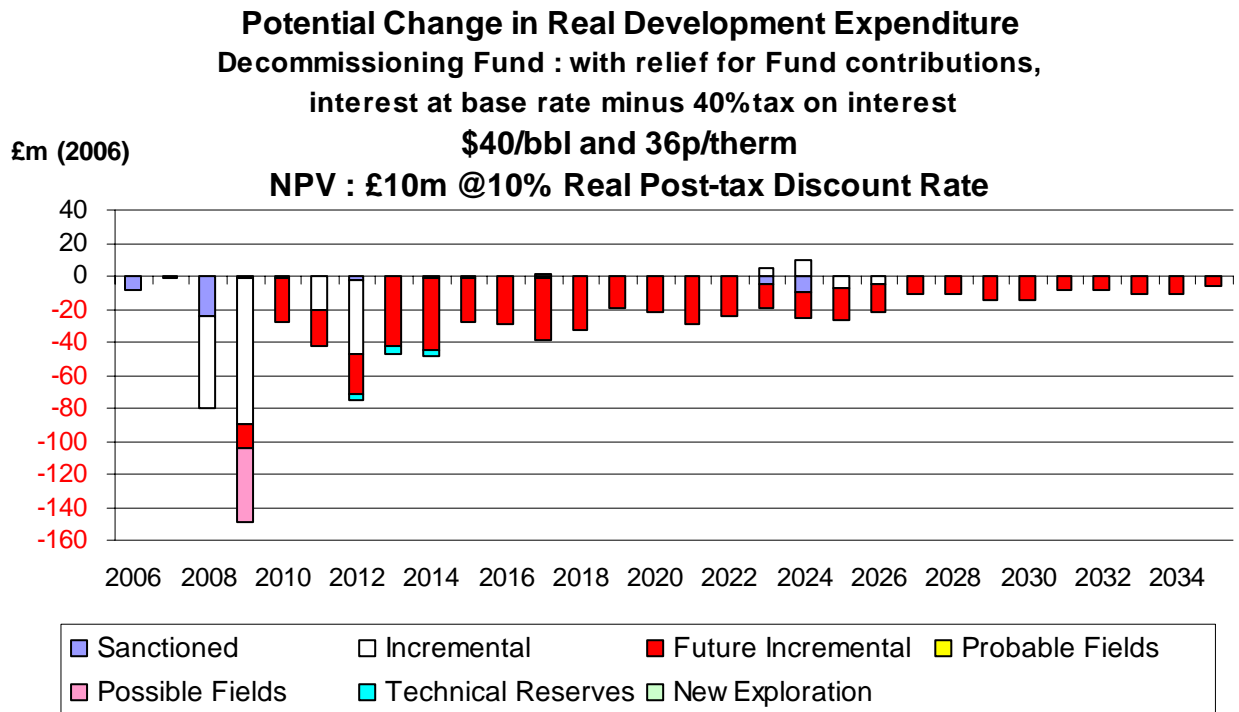
Chart 128 shows the corresponding lost production. It cumulates to 346Mboe.

Chart 128

Potential Change in Production
Decommissioning Fund : with relief for Fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate
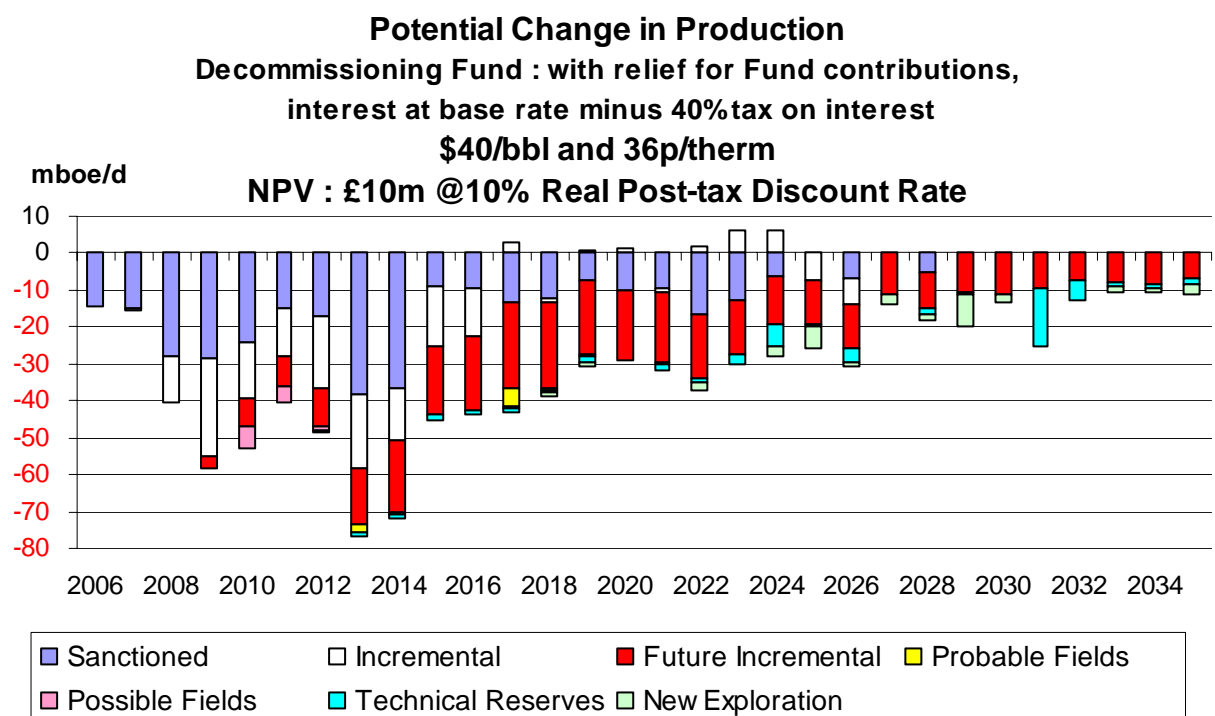
It was found that a large share of the reduction in production emanated from projects failing to pass the economic hurdle following the introduction of the Fund.

Chart 129 shows the change in tax revenue (excluding the tax on interest). This cumulates to a total reduction of £2861m in the period to 2035.

Chart 129

Potential Change in Real Tax Revenue
(excludes effect of tax on interest)
Decommissioning Fund : with relief for Fund contributions, interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
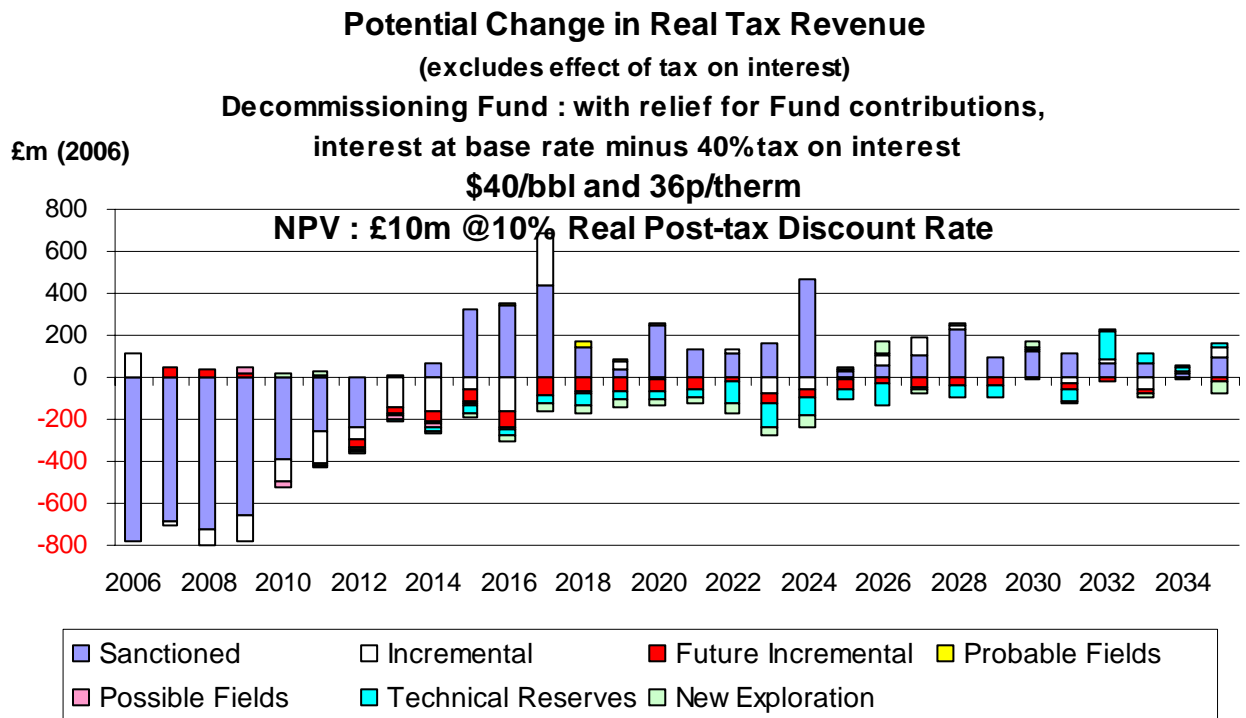
Chart 130 shows the change in tax revenue taking into account the tax on interest. The total cumulates to a decrease in tax revenue of £1207m in the period to 2035.

Chart 130

Potential Change in Real Tax Revenue
Decommissioning Fund : with relief for Fund contributions, $40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m(2006)

Legend: ■ Sanctioned ☐ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves ☐ New Exploration
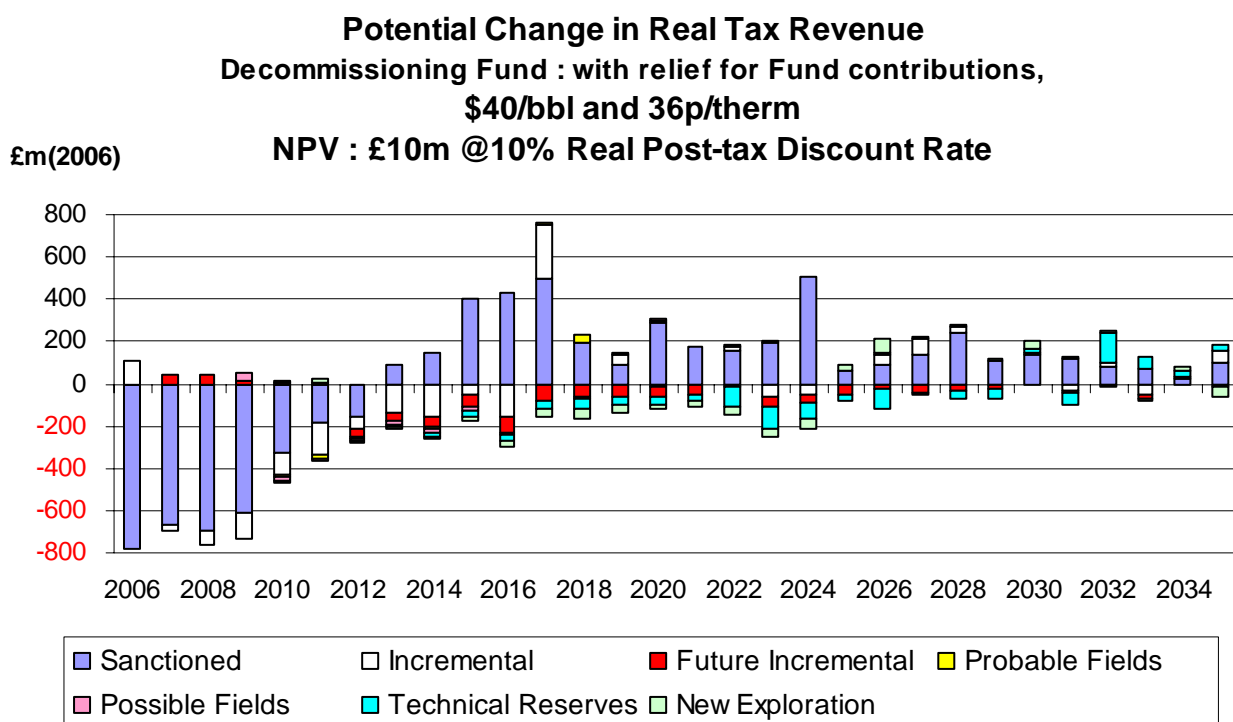
Fund 5

The 5th Fund scenario is the same as the 4th one except that no tax relief is given for Fund contributions. Decommissioning tax relief is given, as under the current system, when the decommissioning costs are actually incurred.

Chart 131 shows the decommissioning costs under the $30, 28 pence case. The total decommissioning cost cumulates to £13389m in the period.

Chart 131

Potential Real Decommissioning Expenditure

Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration
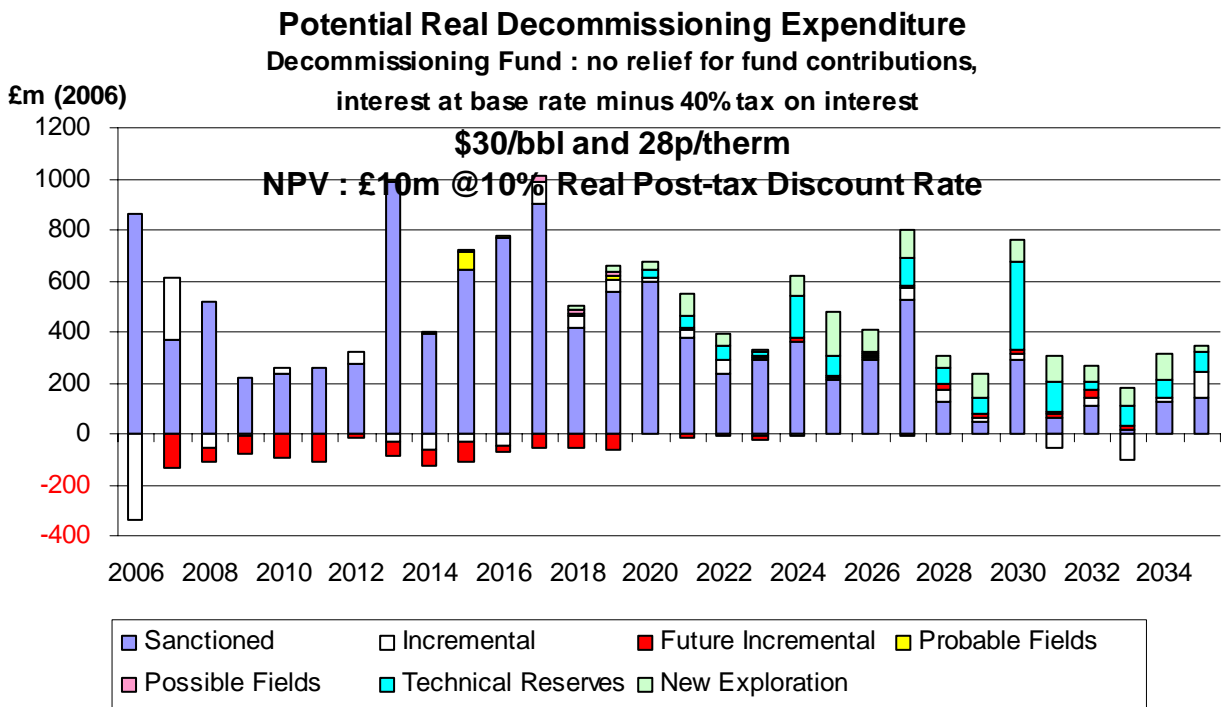
Chart 132 shows the decommissioning relief. It cumulates to £7501m in the period to 2035.

Chart 132

Potential Real Decommissioning Relief

Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration
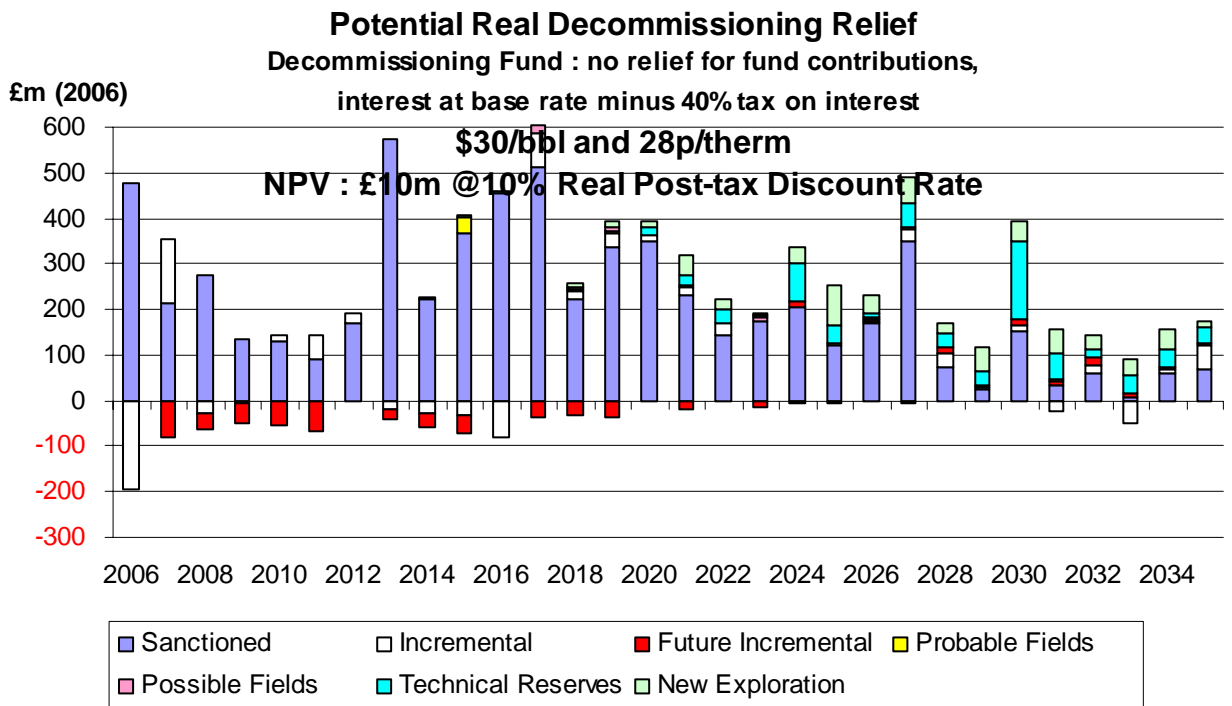
Chart 133 shows the tax on the Fund interest. The total cumulates to £1432m in the period to 2035.

Chart 133

Potential Real Tax on Interest
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
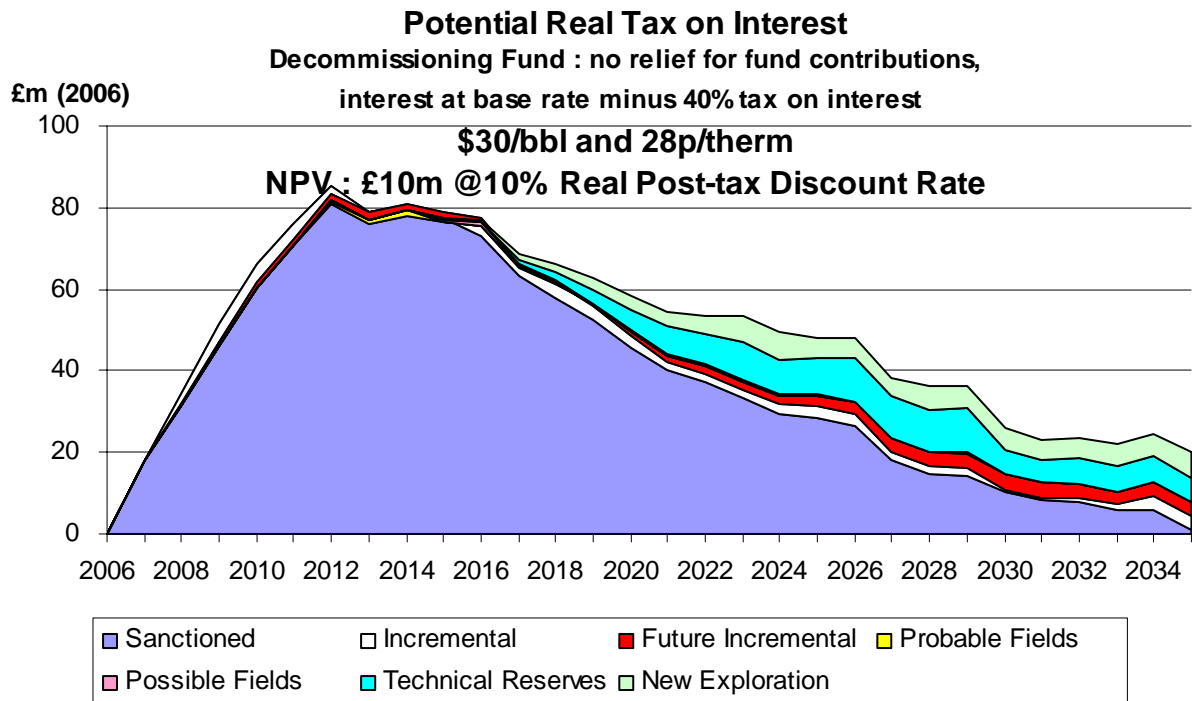
Chart 134 shows the Fund contributions. They may cumulate to £11614m in the period to 2035.

Chart 134

Potential Real Fund Payments
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
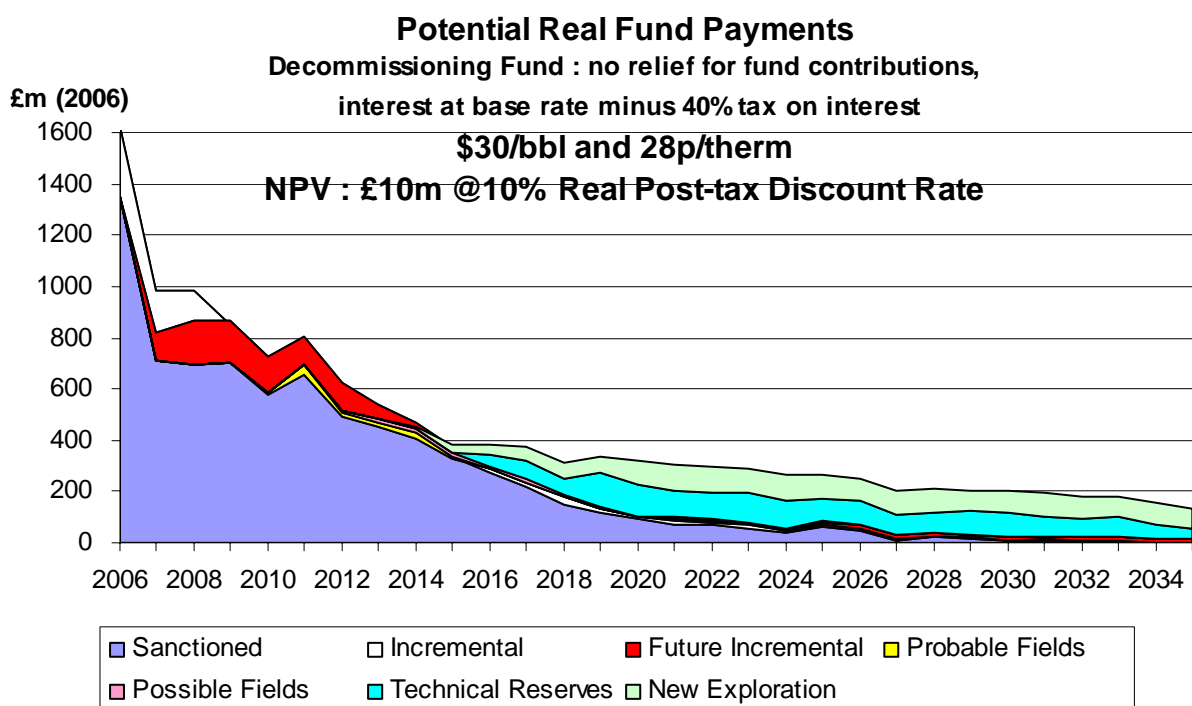
Chart 135 shows the potential Fund shortfall under the medium price. The shortfall may cumulate to £2784m in the period to 2035.

Chart 135

Potential Real Fund Shortfall
**Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest**

$30/bbl and 28p/therm
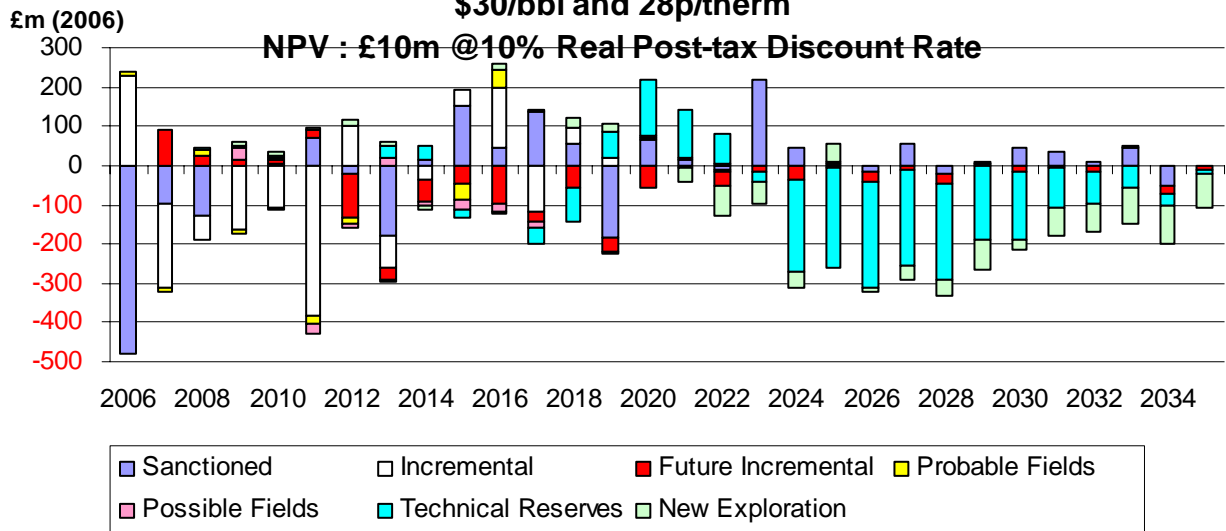**NPV : £10m @10% Real Post-tax Discount Rate**
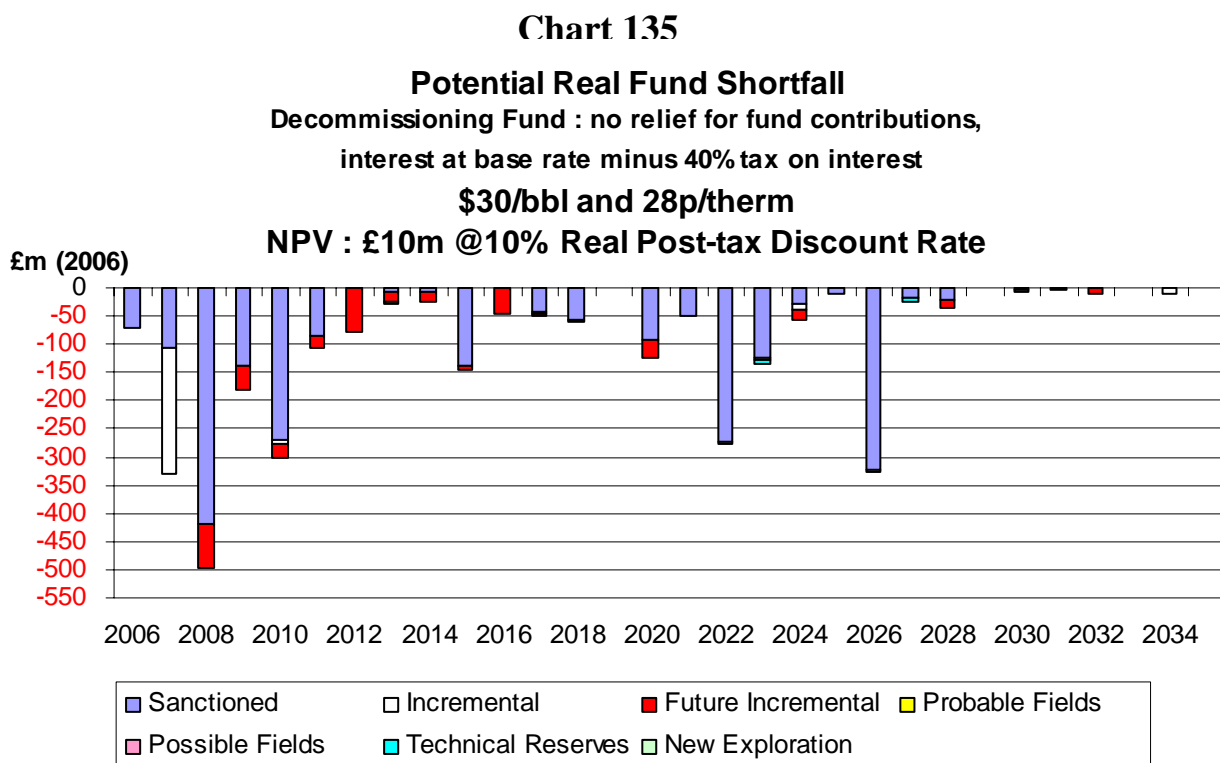
Chart 136 shows the change in operating costs following the introduction of the Fund. The total reduction cumulates to £5505m in the period.

Chart 136

Potential Change in Real Operating Expenditure
**Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest**

$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
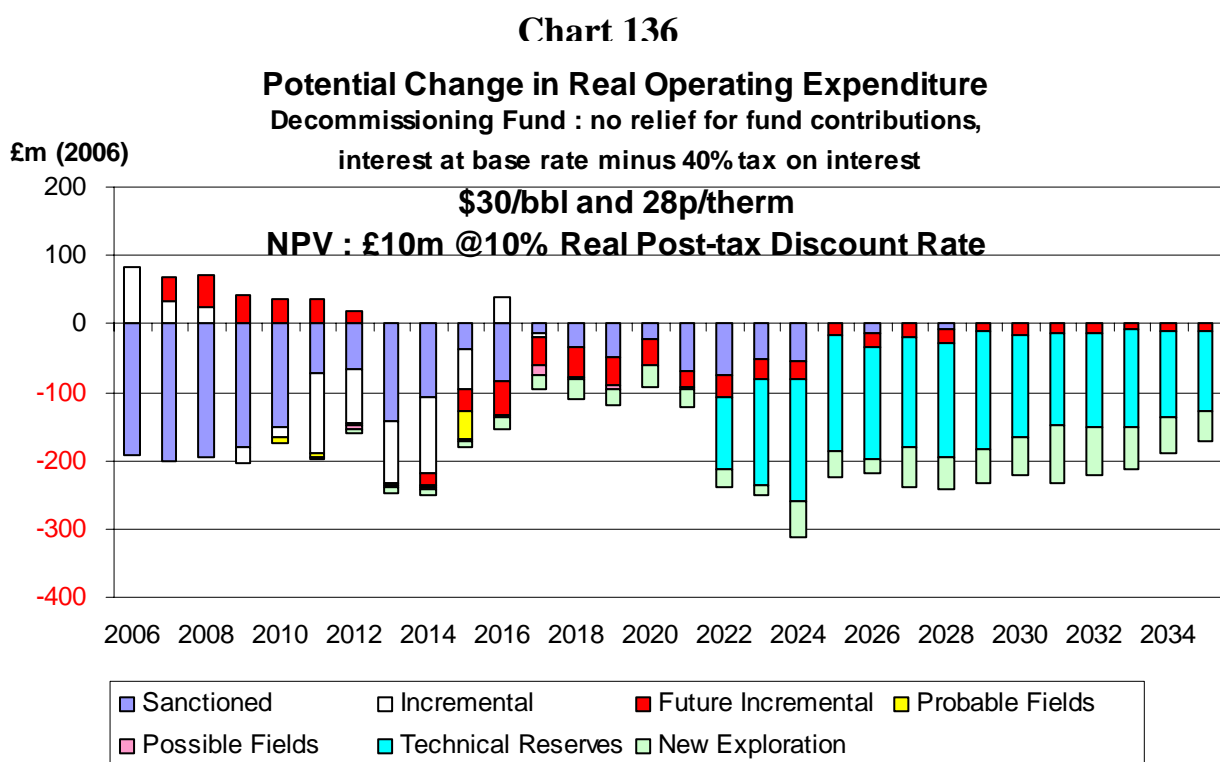
Chart 137 shows the corresponding development expenditure foregone which may cumulate to £4158m.

Chart 137

Potential Change in Real Development Expenditure
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate
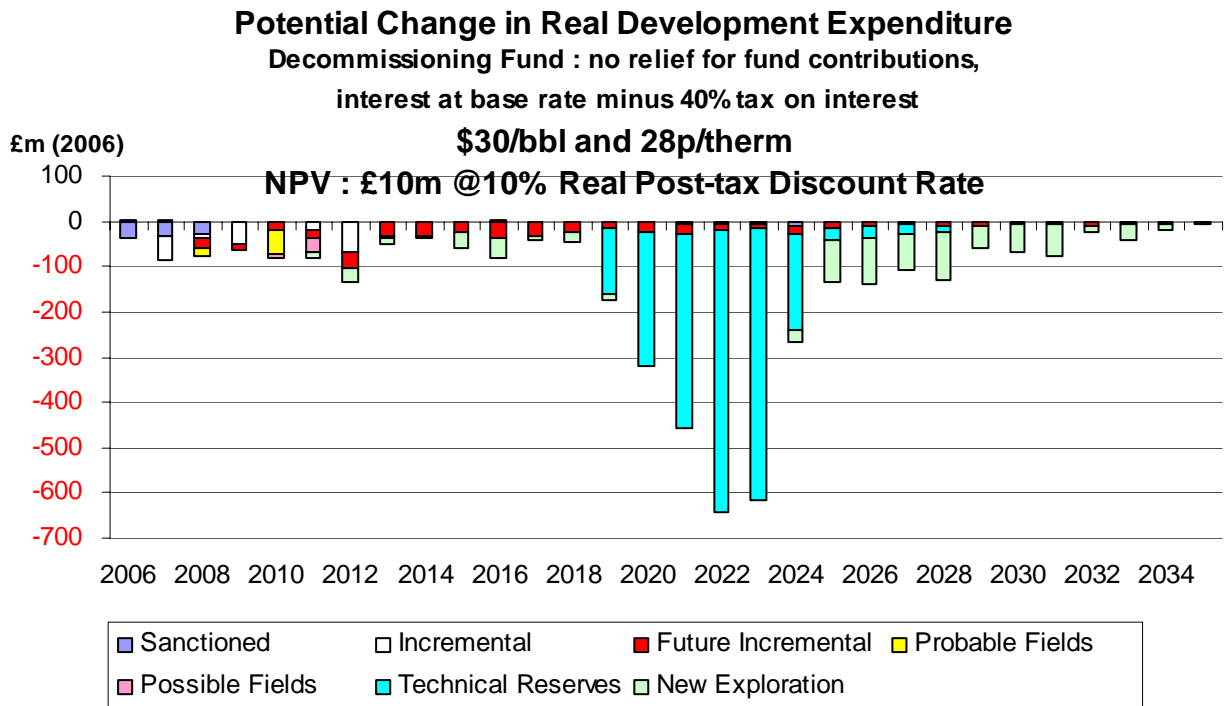
Chart 138 shows the corresponding production which may be foregone. It cumulates to 843Mboe.

Chart 138

Potential Change in Production
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
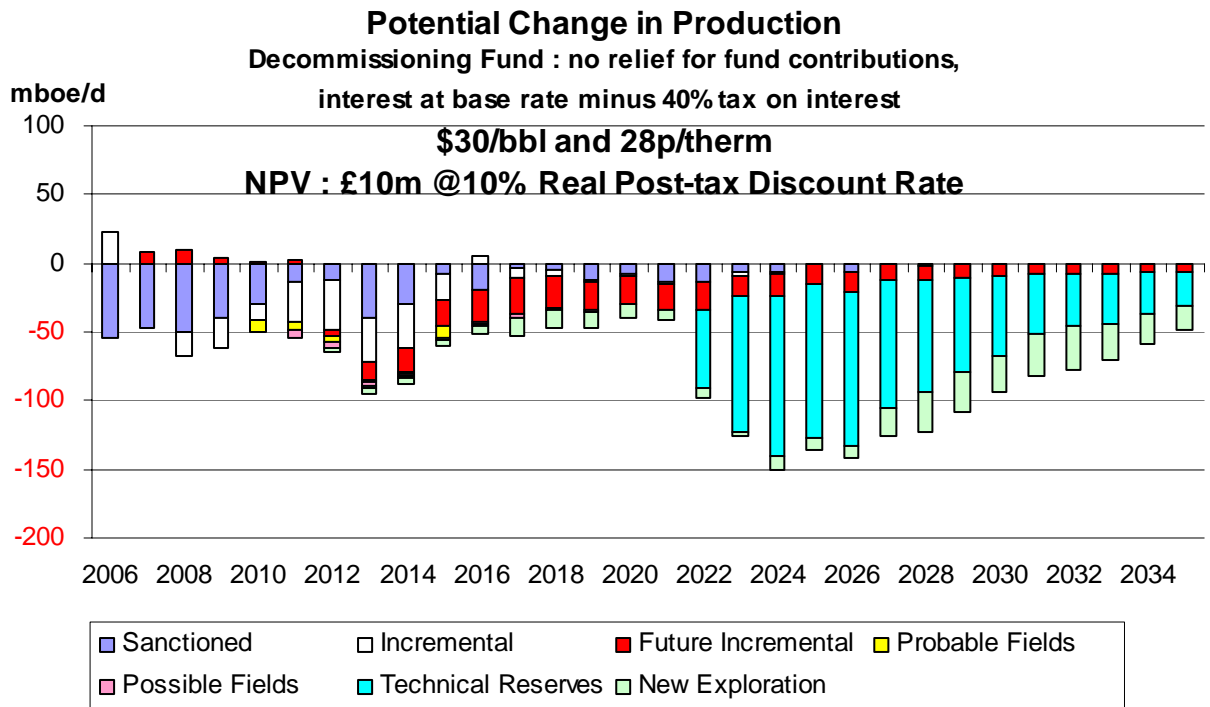
It was found that the great majority of the loss in production emanated from the failure of the projects to pass the economic hurdle following the introduction of the Fund.

Chart 139 shows the change in tax revenues (excluding the tax on interest). This cumulates to a reduction of £3668m in the period.

Chart 139

Potential Change in Real Tax Revenue
(excludes effect of tax on interest)
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 140 shows the change in tax revenue taking account of the tax on interest. This may cumulate to a decrease in tax revenue of £2236m in the period to 2035 when the tax on interest is included.

Chart 140

Potential Change in Real Tax Revenue
Decommissioning Fund : no relief for fund contributions,
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
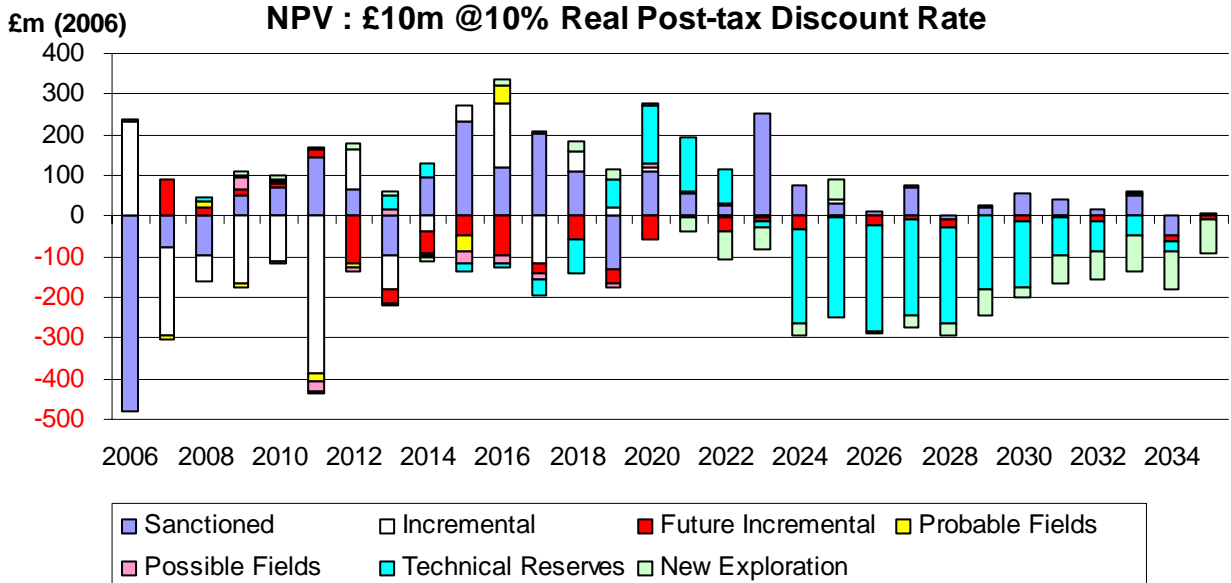
The results under the $40, 36 pence case are now discussed. Chart 141 shows the decommissioning costs. They cumulate to £15095m in the period to 2035.

Chart 141

Potential Real Decommissioning Expenditure
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
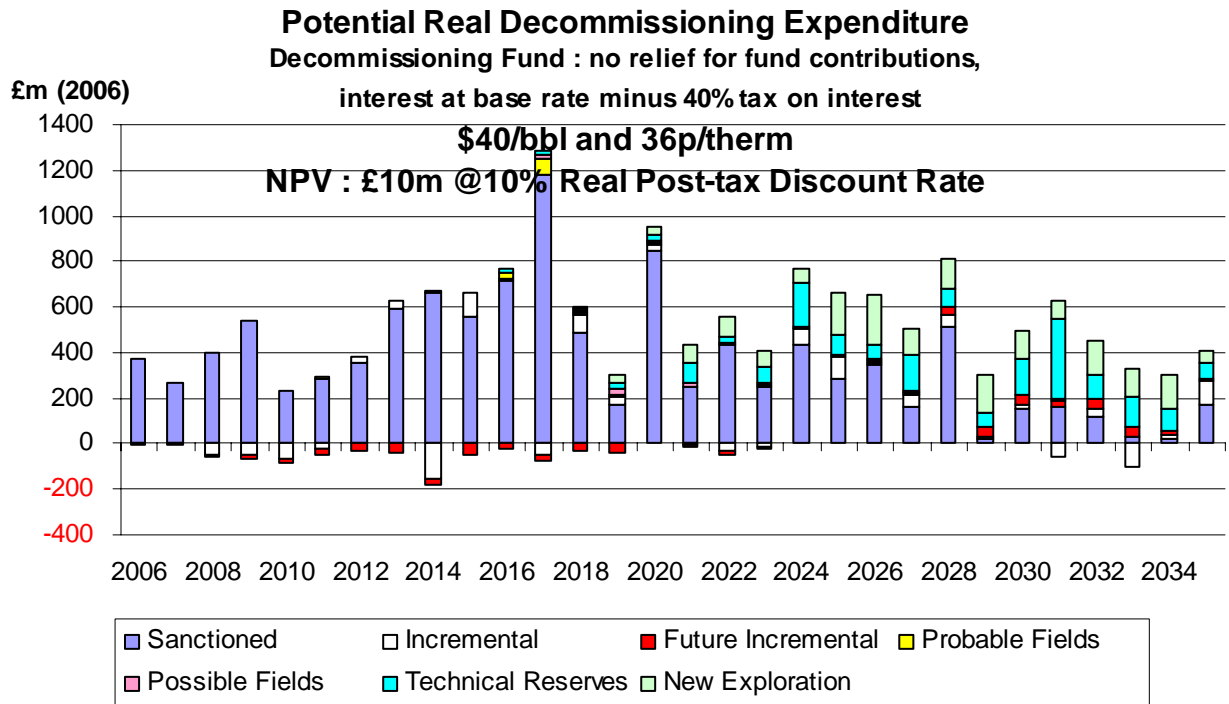
Chart 142 shows the decommissioning relief. The total cumulates to £8386m in the period to 2035.

Chart 142

Potential Real Decommissioning Relief
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
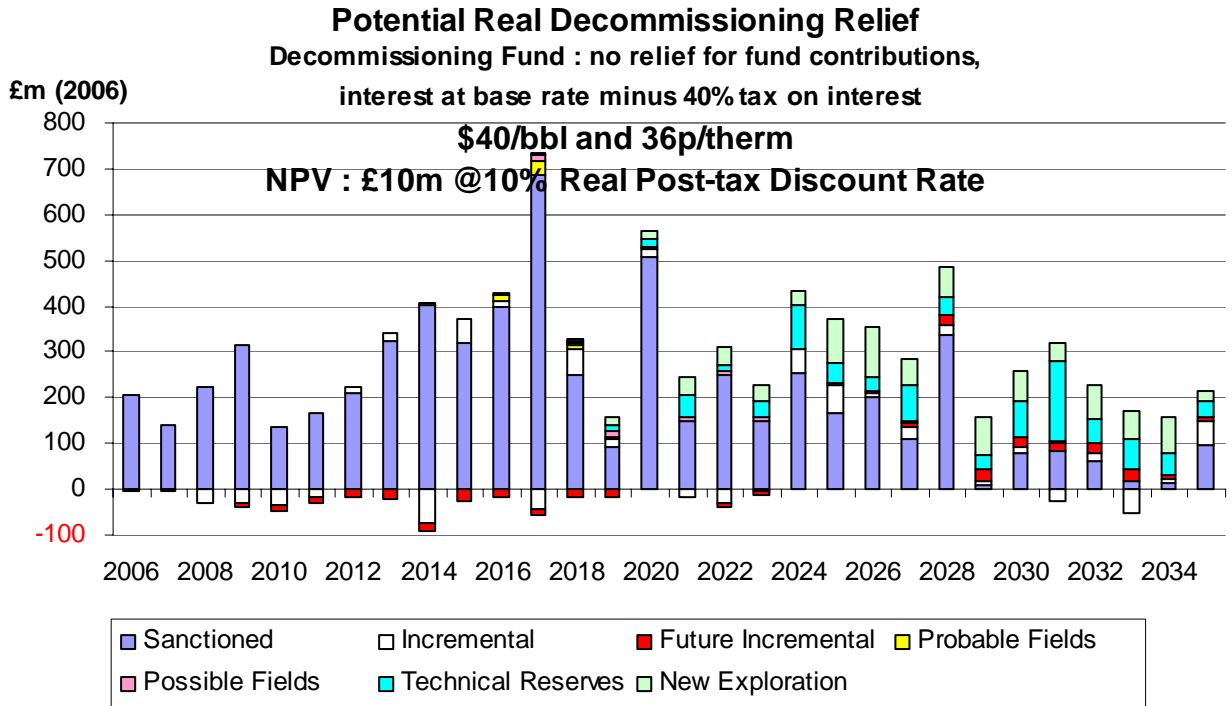
Chart 143 shows the tax on the Fund interest. The total cumulates to £1580m in the period.

Chart 143

Potential Real Tax on Interest
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest

£m (2006)

$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

110
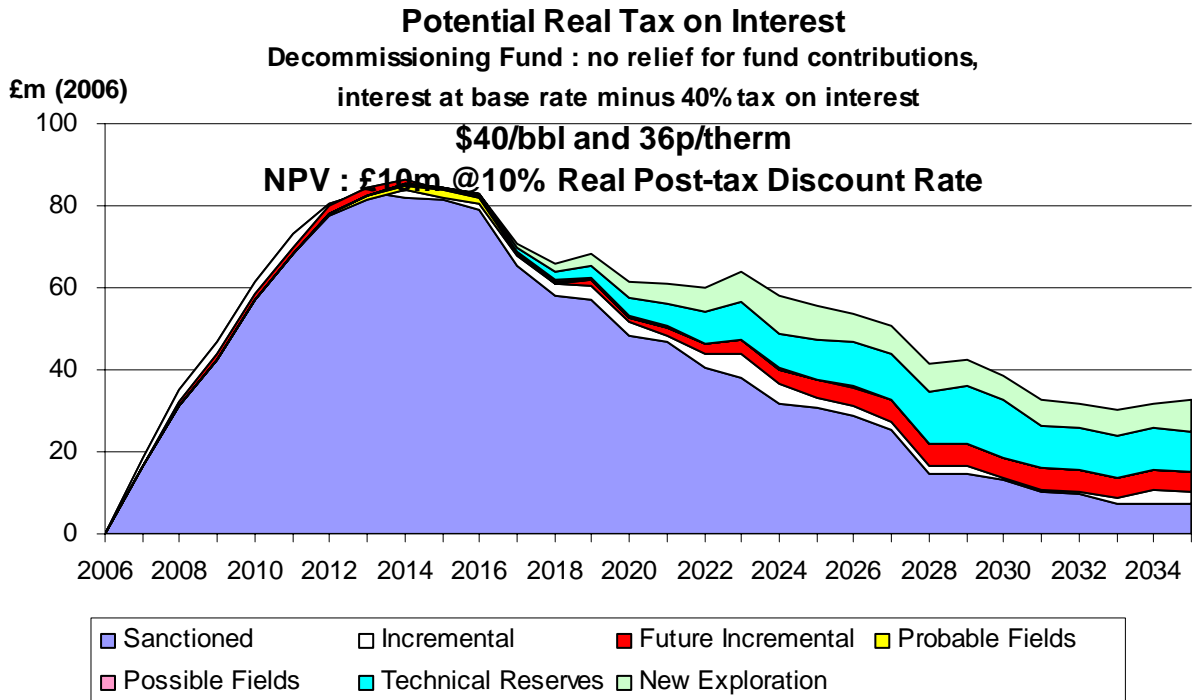
Chart 144 shows the Fund contributions. They may cumulate to £14632m in the period.

Chart 144

Potential Real Fund Payments

Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
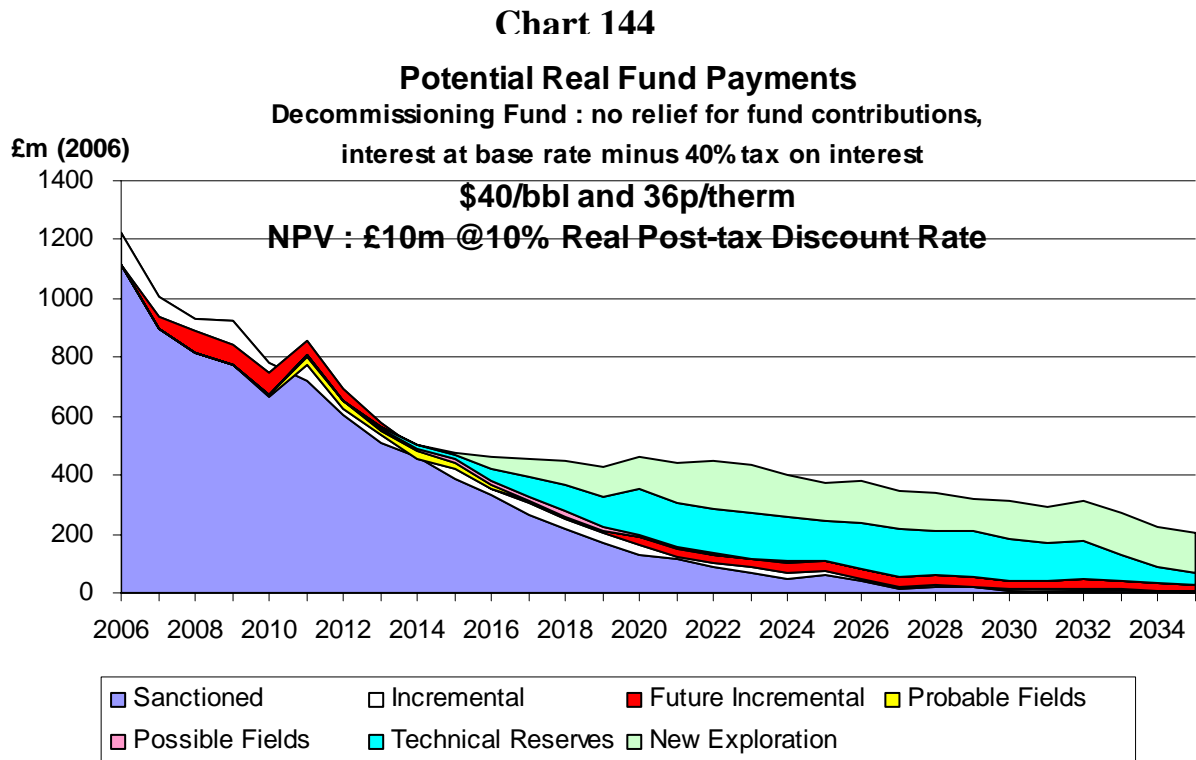
Chart 145 shows the Fund shortfall. It cumulates to £1685m in the period to 2035.

Chart 145

Potential Real Fund Shortfall

Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest

$40/bbl and 36p/therm

NPV : £10m @10% Real Post-tax Discount Rate
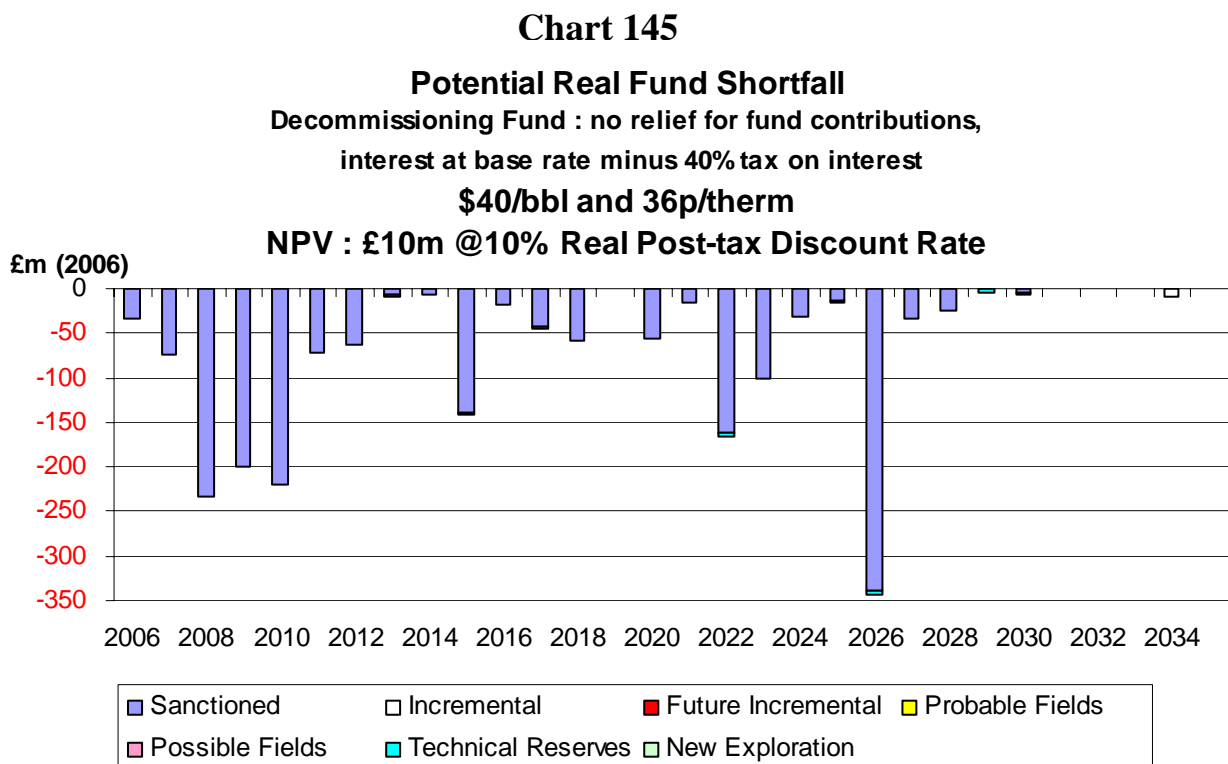
Chart 146 shows the change in operating costs which may occur with a Fund scheme under the high price. The change in operating costs may cumulate to £2334 in the period to 2035.

Chart 146
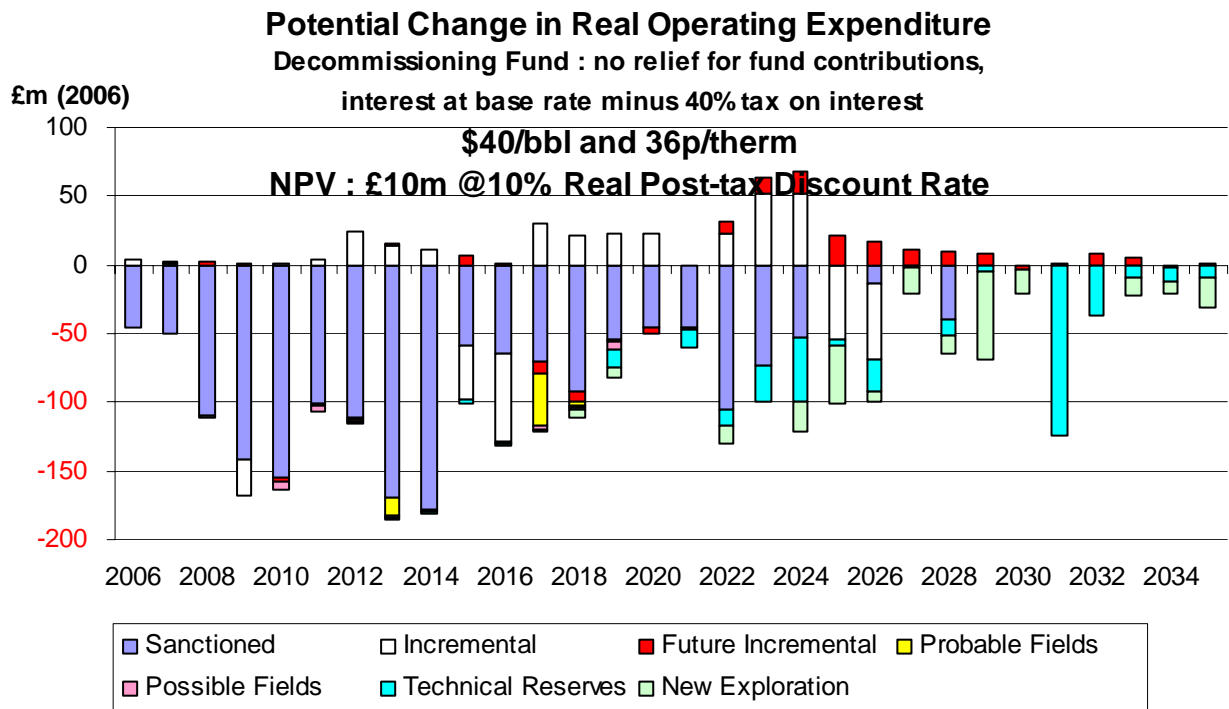
Chart 147 shows the corresponding change in development expenditure. It cumulates to £1152m.

Chart 147

Potential Change in Real Development Expenditure
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: ■ Sanctioned □ Incremental ■ Future Incremental □ Probable Fields
■ Possible Fields ■ Technical Reserves □ New Exploration
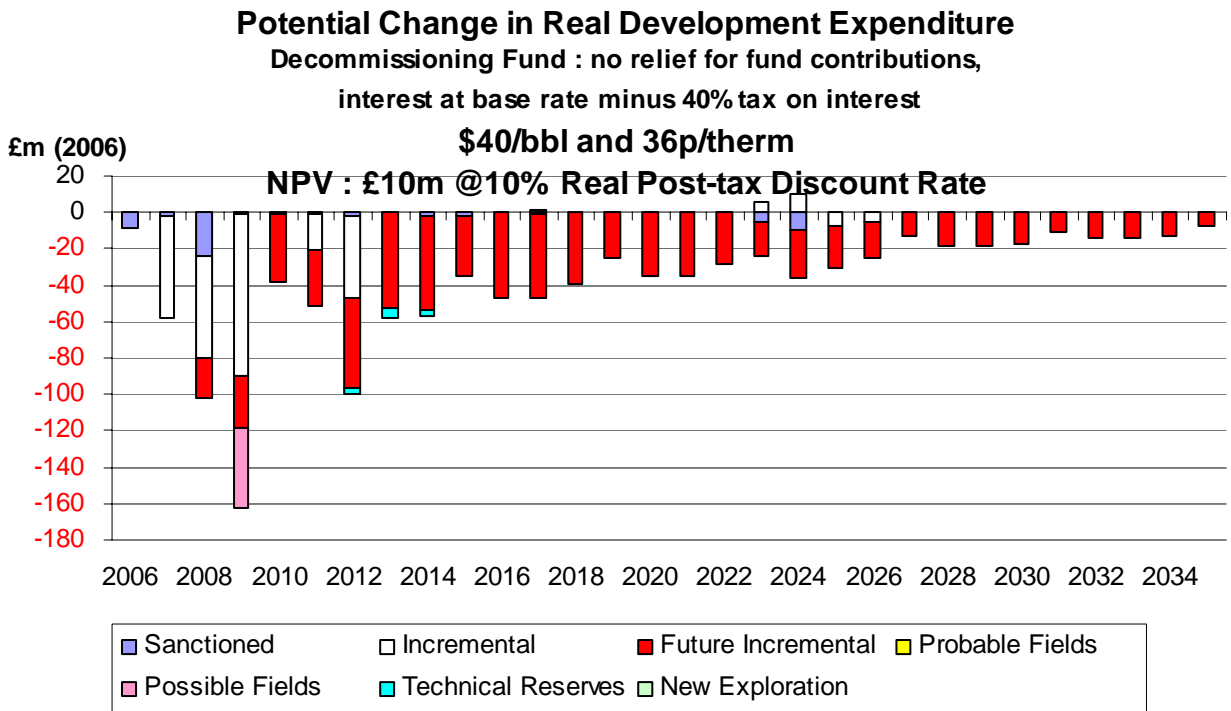
Chart 148 shows the corresponding potential production which may be foregone. This could cumulate to 407Mboe.

Chart 148

Potential Change in Production
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

mboe/d

Legend: ■ Sanctioned □ Incremental ■ Future Incremental □ Probable Fields
■ Possible Fields ■ Technical Reserves □ New Exploration
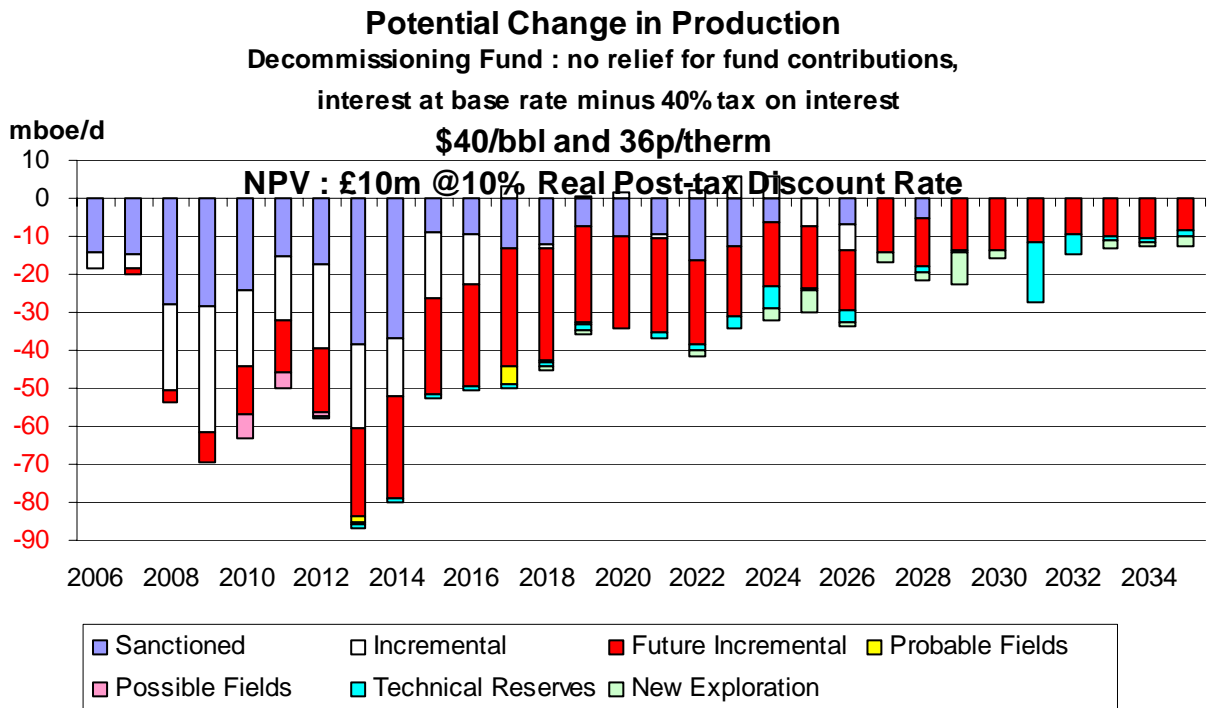
It was found that a substantial part of the loss of production was due to the failure of projects to pass the economic hurdle following the introduction of the Fund.

Chart 149 shows the change in tax revenue (excluding the tax on interest) following the introduction of the Fund scheme. This cumulates to a reduction in tax revenue of £2864m in the period to 2035 when the tax on interest is excluded.

Chart 149

Potential Change in Real Tax Revenue
(excludes effect of tax on interest)
Decommissioning Fund : no relief for fund contributions,
interest at base rate minus 40% tax on interest
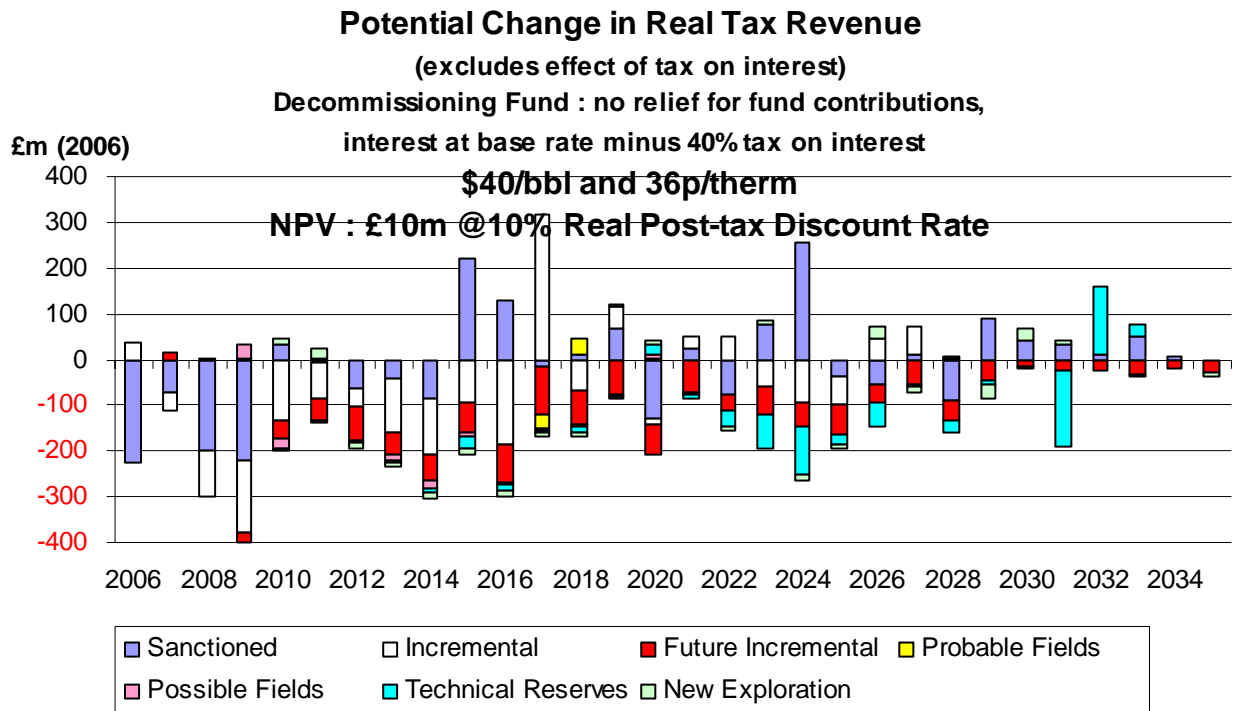
Chart 150 shows the change in tax revenues taking into account the tax on interest. The total cumulate to a decrease in tax revenue of £1284m in the period.

Chart 150

Potential Change in Real Tax Revenue
Decommissioning Fund : no relief for fund contributions,
$40/bbl and 36p/therm
NPV : £10m @10% Real Post-tax Discount Rate

£m (2006)

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration
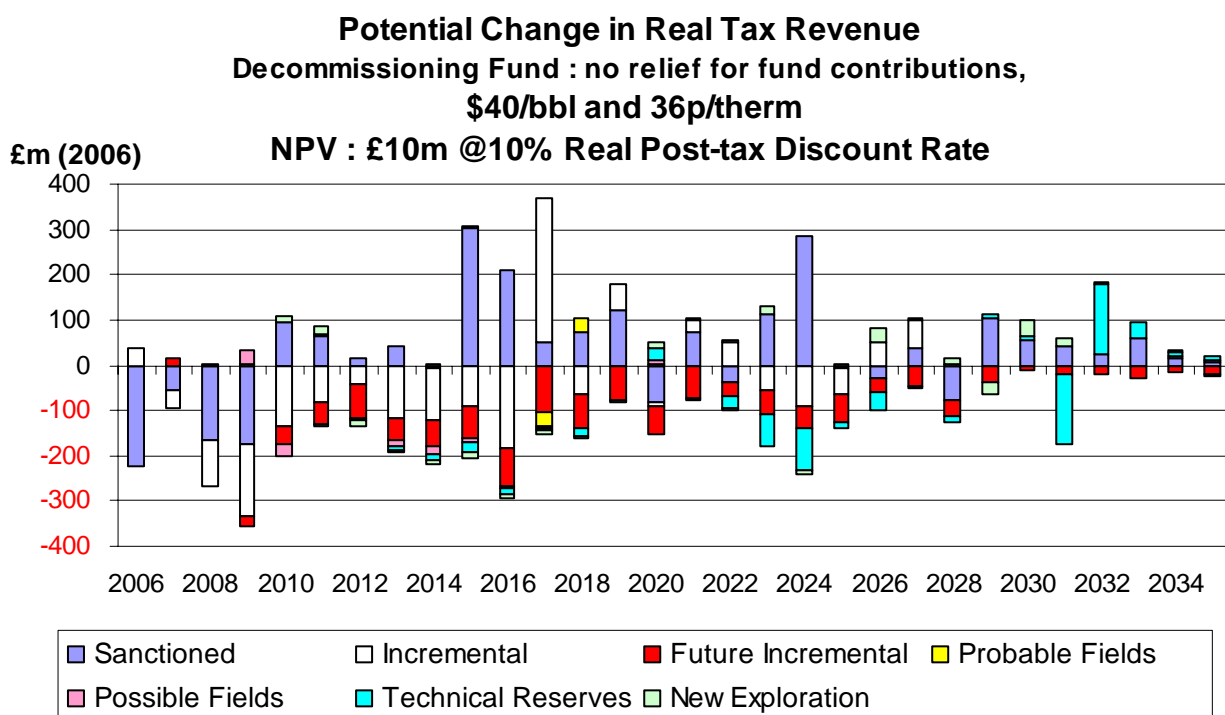
4.   Small Operators, Front-End Field Risks, and LOCs

Currently a considerable number of prospective new fields are being developed by relatively small companies. The fields in question are generally small in size. There is a risk that if the reservoir substantially under-performs the result could be an early economic failure and the need to cease production and decommission the facilities. Given this risk the DTI has in some cases requested LOCs from the companies to cover this early risk.

In order to see the effects of these a portfolio of 23 new fields operated by small/medium-sized companies was selected for examination. They covered a range of field development types. The modelling assumed that a LOC was in place for a year during the development period prior to first production on the same terms as that discussed above. The modelling was also undertaken in the same manner as discussed above.

115

The results under the $30, 20 pence case are now discussed. Charts 151, 152 and 153 show the potential operating costs, development costs and production associated with these 23 fields under the $30, 28 pence case.

Chart 151

Potential Real Operating Expenditure including LOC Cost
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible, Passed Probable, Failed Possible, Failed Probable

Chart 152

Potential Real Development Expenditure
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible, Passed Probable, Failed Possible, Failed Probable

Chart 153

Potential Production
Small Operators
$30/bbl and 28p/therm
NPV : £10m @10% Real Post-tax Discount Rate

Legend: Passed Possible, Passed Probable, Failed Possible, Failed Probable

Six fields fail the hurdle even before the imposition of the LOC cost. Cumulatively to 2035, the operating costs plus the LOC cost amount to £845m, the development costs amount to £1011m and the production to 250Mboe.

Chart 154 shows the decommissioning costs of these fields under the medium price. The decommissioning expenditures may cumulate to £71m in the period to 2035.

Chart 154

Potential Real Decommissioning Expenditure
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Legend: Passed Possible | Passed Probable | Failed Possible | Failed Probable
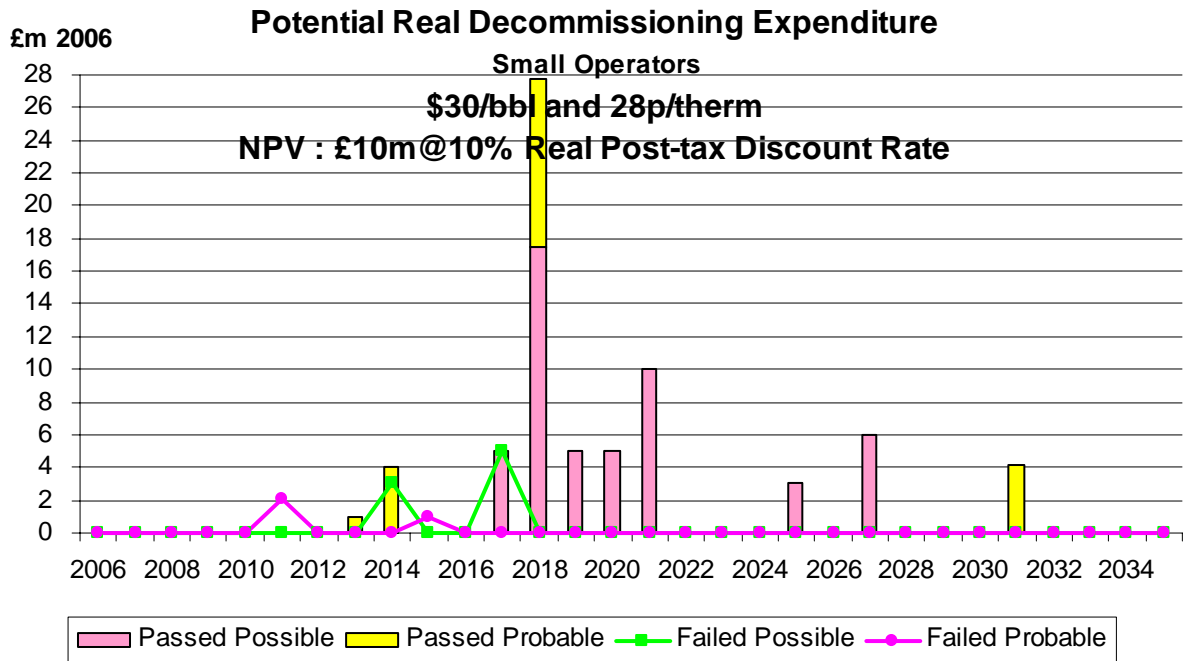
Chart 155 shows the decommissioning tax relief. It cumulates to £36m in the period to 2035.

Chart 155

Potential Real Decommissioning Relief (including LOC relief)
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Legend: Passed Possible | Passed Probable | Failed Possible | Failed Probable

118
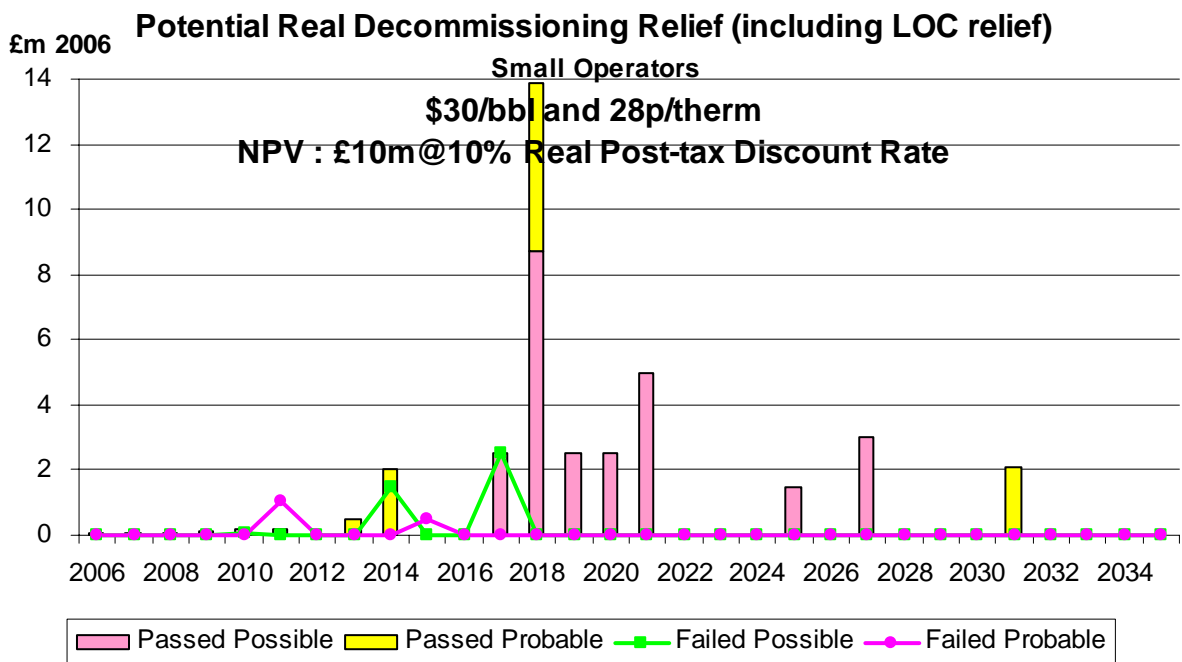
Chart 156 shows the LOC costs which obtain tax relief, Chart 157 shows the LOC costs which are not relievable for tax purposes and Chart 158 shows the total LOC. These cumulate to £1.4m, £4.43m and £5.83m respectively.

Chart 156

Potential Real LOC Relievable Costs
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Passed Possible ▪ Passed Probable ▪ Failed Possible ▪ Failed Probable

Chart 157

Potential Real LOC Unrelievable Costs
Small Operators
$30/bbl and 28p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Passed Possible ▪ Passed Probable ▪ Failed Possible ▪ Failed Probable

Chart 158

Potential Real Total LOC Costs

£m 2006

Small Operators

$30/bbl and 28p/therm

NPV : £10m@10% Real Post-tax Discount Rate
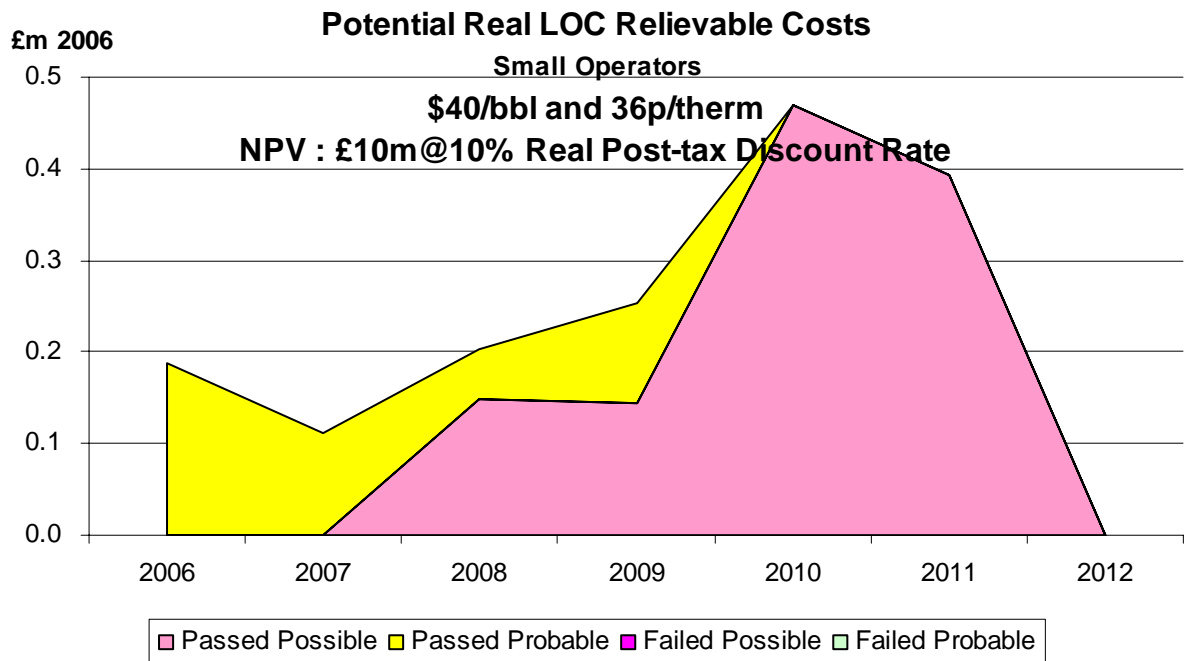

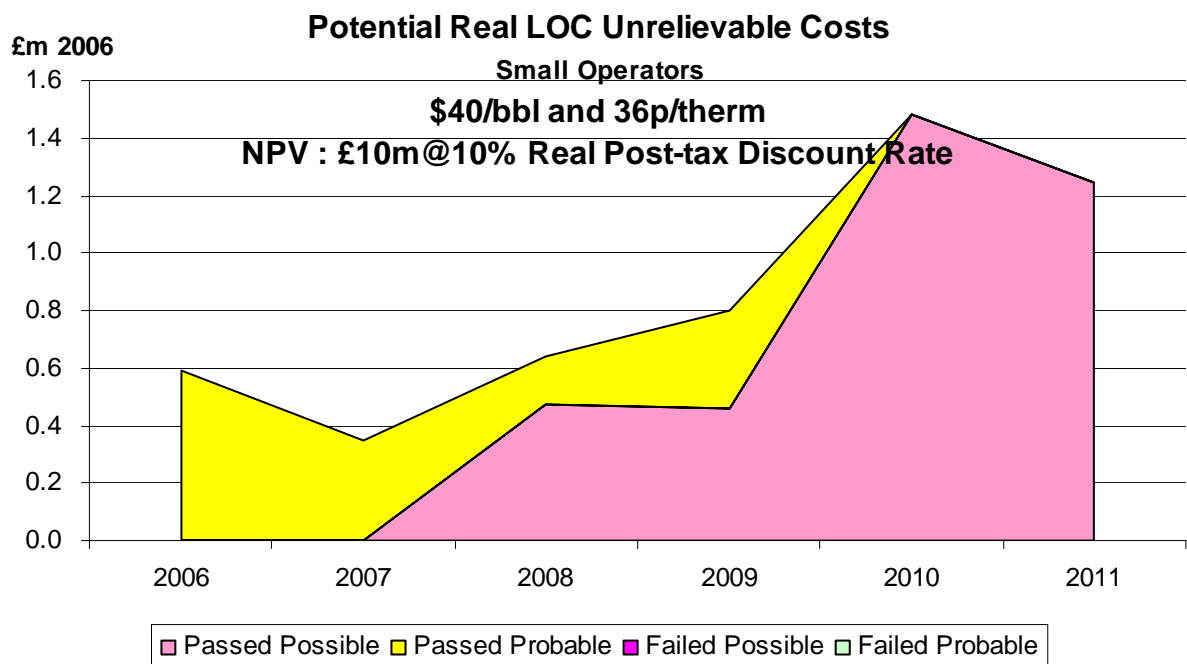Passed Possible ☐ Passed Probable ☐ Failed Possible ☐ Failed Probable

Chart 159 shows the relief given for LOC costs. This cumulates to £0.7m in the period to 2035.

Chart 159

Potential Real LOC Relief

£m 2006

Small Operators

$30/bbl and 28p/therm

NPV : £10m@10% Real Post-tax Discount Rate

Passed Possible ☐ Passed Probable ☐ Failed Possible ☐ Failed Probable
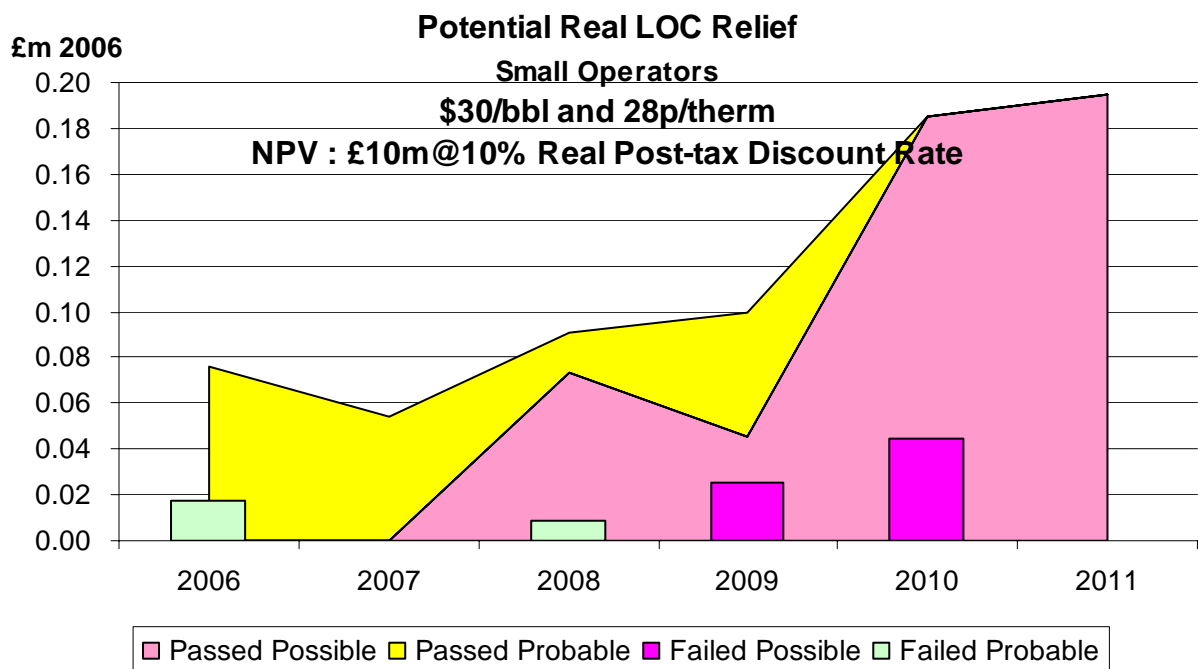
Chart 160 shows the total LOC cost minus LOC tax relief. This cumulates to £6.53m in the period to 2035.

Chart 160
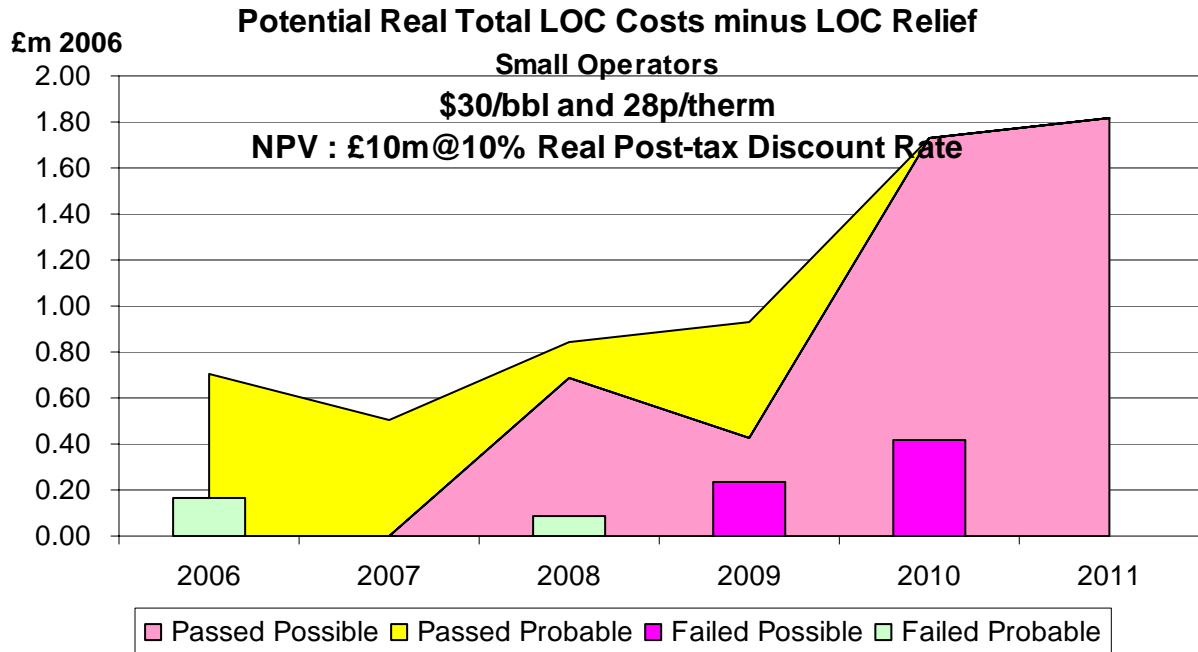
Under the $40, 36 pence case 2 fields fail the hurdle rate even before the imposition of the LOC cost. Cumulatively to 2035, the operating costs plus the LOC costs may amount to £920m, development costs to £1161m and the production to 269Mboe.

Chart 161 shows the decommissioning cost of these fields. The total expenditure cumulates to £82m in the period to 2035.

Chart 161

Potential Real Decommissioning Expenditure

£m 2006

Small Operators

$40/bbl and 36p/therm

NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible — Passed Probable — Failed Possible — Failed Probable
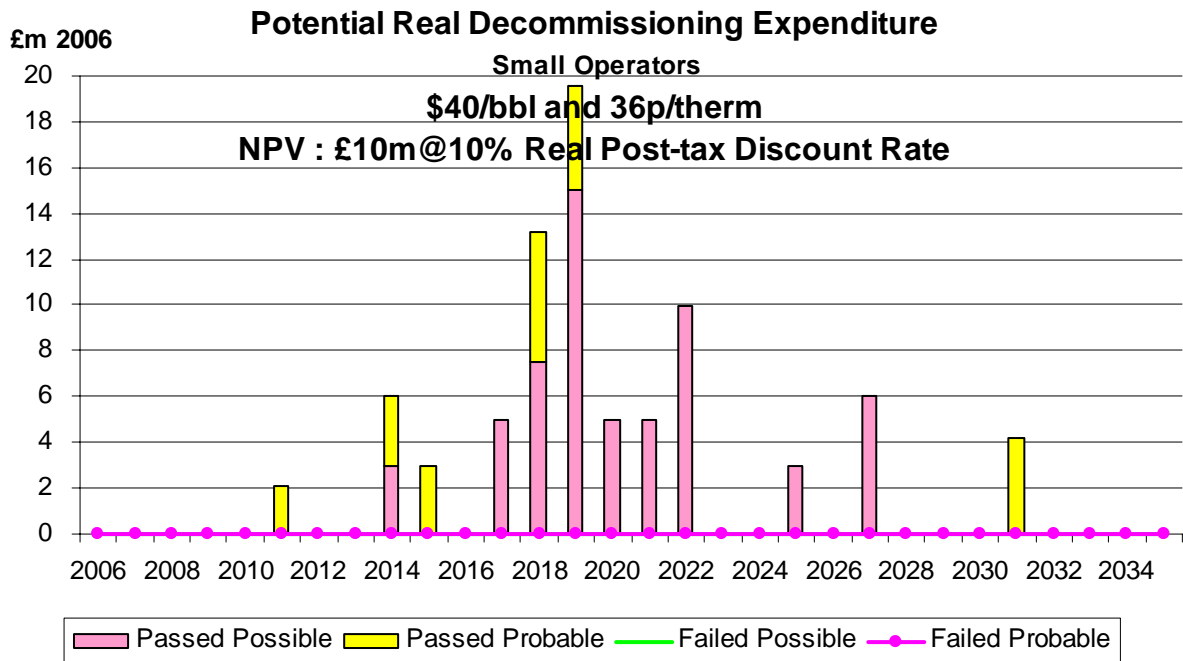
Chart 162 shows the decommissioning relief. The total cumulates to £42m in the period to 2035.

Chart 162

Potential Real Decommissioning Relief (including LOC relief)

£m 2006

Small Operators

$40/bbl and 36p/therm

NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible — Passed Probable — Failed Possible — Failed Probable
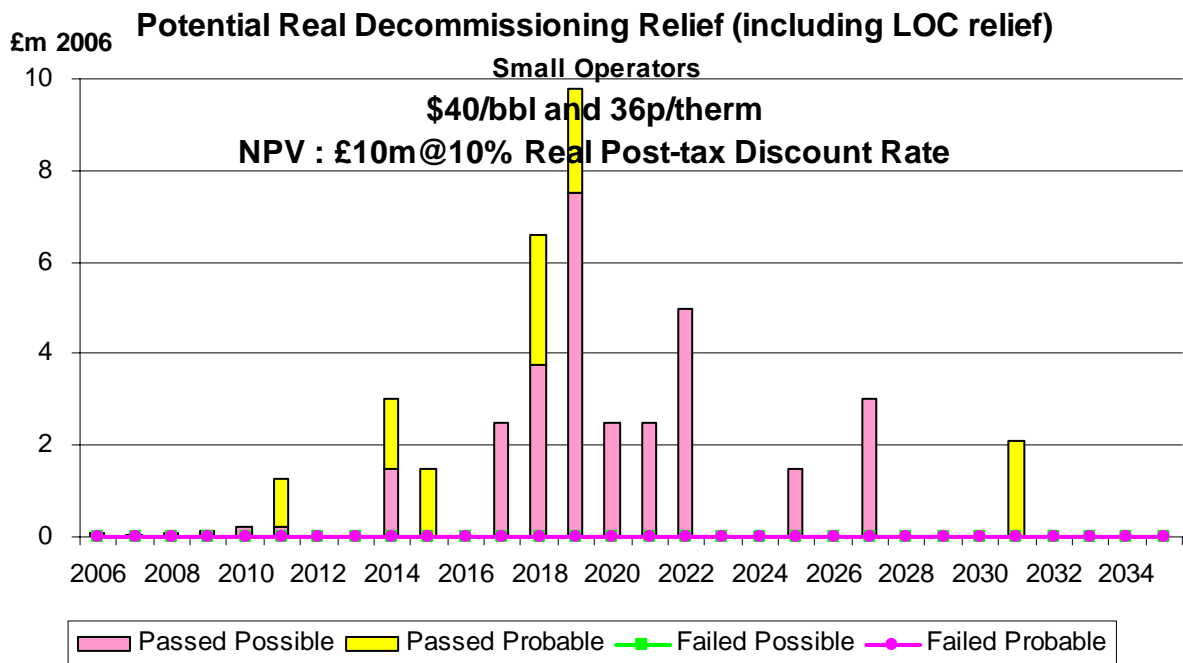
Chart 163 shows the LOC costs which obtain tax relief, Chart 164 shows those costs which are not relievable and Chart 165 shows the total LOC cost. These cumulate to £1.62m, £5.12m and £6.73m respectively.

Chart 163

Potential Real LOC Relievable Costs
Small Operators
$40/bbl and 36p/therm
NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible, Passed Probable, Failed Possible, Failed Probable

Chart 164

Potential Real LOC Unrelievable Costs
Small Operators
$40/bbl and 36p/therm
NPV : £10m@10% Real Post-tax Discount Rate

Legend: Passed Possible, Passed Probable, Failed Possible, Failed Probable

Chart 165

Potential Real Total LOC Costs
Small Operators
$40/bbl and 36p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Legend: Passed Possible ■ Passed Probable □ Failed Possible ■ Failed Probable □

Chart 166 shows the relief given for LOC costs. This cumulates to £0.81m in the period to 2035.

Chart 166

Potential Real LOC Relief
Small Operators
$40/bbl and 36p/therm
NPV : £10m@10% Real Post-tax Discount Rate

£m 2006

Legend: Passed Possible ■ Passed Probable □ Failed Possible ■ Failed Probable □
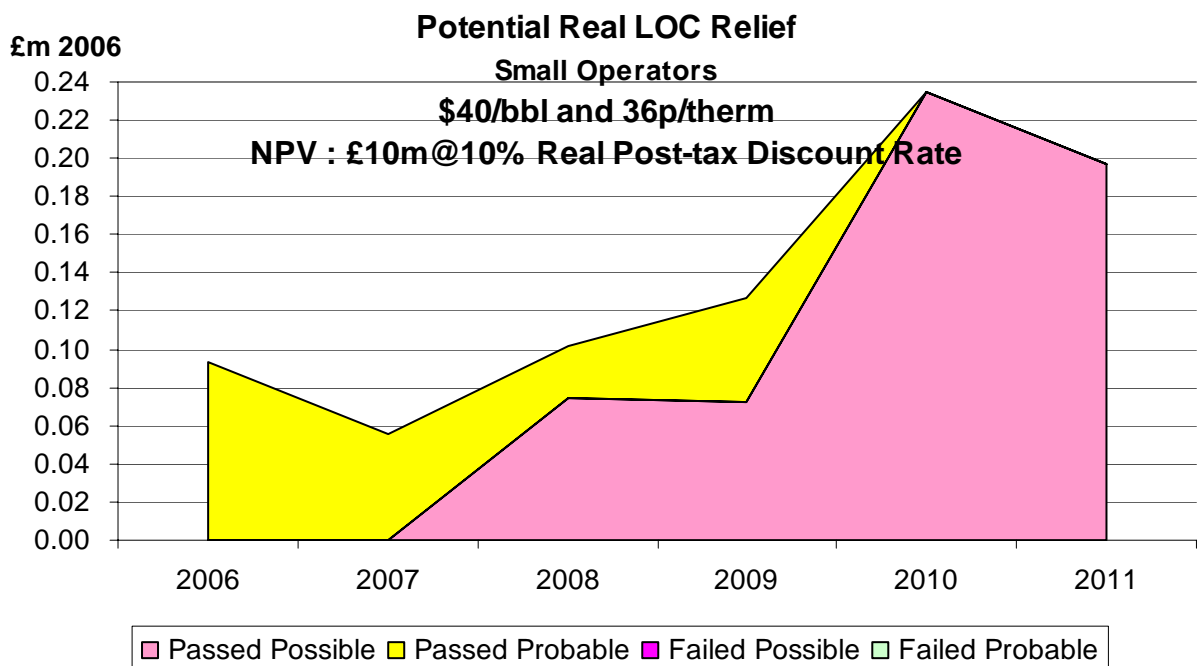
Chart 167 shows the total LOC cost minus LOC tax relief. This cumulates to £7.54m in the period to 2035.

Chart 167
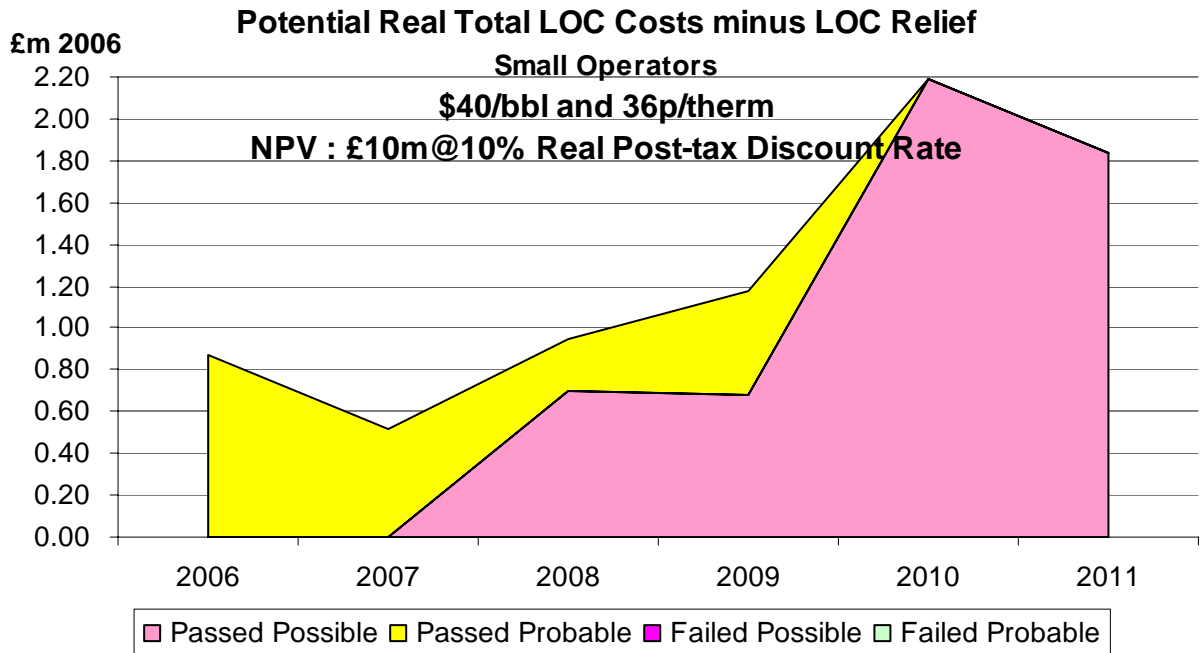
The cost of this limited LOC scheme thus amount to between £6.53m and £7.54m.

5.   **Summary and Conclusions**

This study has examined the comparative effects of different forms of providing for financial security with respect to decommissioning in the UKCS. The study employed financial simulation modelling including use of the Monte Carlo technique to project likely cessation of production (COP) and thus decommissioning dates for fields and associated incremental projects to 2035. The modelling included (1) sanctioned fields (316), (2) incremental projects relating to these fields (112), (3) probable fields (19), (4) possible fields (23), (5) future incremental projects, (6) technical reserves fields (215), and (7) future

discoveries. The numbers of new discoveries depend on the exploration effort which in turn depends in part on oil/gas price expectations. Given the long-run nature of the study three scenarios with price assumptions with (1) $30, 28 pence, (2) $40, 36 pence, and (3) $25, 24 pence in real 2006 terms were developed. The corresponding number of new discoveries in the period 2006-2030 were (1) 179, (2) 221, and (3) 146.

The investment and COP decisions were made in accordance with expected returns in the 3 scenarios. A cost of capital of 10% in real, post-tax terms was employed with a minimum requirement of an NPV of £10 million. The numbers of new developments in the technical reserves and new discoveries categories were quite sensitive to the price scenario employed. The maximum number of decommissionings which could take place by 2035 was found to be 239 under the $40, 36 pence scenario. The total cumulative decommissioning costs to 2035 were found to be £14.45 billion under the $30, 28 pence case, £15.2 billion under the $40, 36 pence case, and £13.12 billion under the $25, 28 pence case (all at 2006 prices).

In the UK there is joint and several liability among licences for decommissioning under the Petroleum Act 1998. Further, the Government can request, and in some circumstances require, a licensee to provide financial security for the prospective decommissioning costs. Asset transactions involving mature fields have become increasingly common with some companies specialising in maximising economic recovery from mature fields. In such cases while the decommissioning obligation may be transferred from the initial licensee to the new one the Government may insist that liability stays with the original one if there are doubts about the financial competence of the new licensee to fulfil the work obligation.

Requests by the Government to provide financial security are conventionally triggered when the remaining net present value (RNPV) from a field falls below a threshold value in relation to the (gross) decommissioning costs. A trigger value of 150% of decommissioning costs is common. Nowadays very small field developments are not uncommon. In such circumstances the DTI can also request financial security for decommissioning to be provided at the time of the field development. This is to protect the Government against a major reservoir failure which could take effect at the date of early production.

While a considerable number of schemes can in principle deal with the problem in the UK Letters of Credit (LOCs) are the only instrument currently employed. These involve the payment of a fee to the bank providing the guarantee. The fee is tax deductible for corporation tax (CT), Supplementary Charge (SC) and Petroleum Revenue Tax (PRT), but the LOCs have to be disclosed in the company's accounts and they impact on its borrowing capacity and costs.

Other methods of providing security for decommissioning include Surety Bonds and Decommissioning Trusts. Surety Bonds are used in the Gulf of Mexico by the Minerals Management Service (MMS). The Bond issuer is generally essentially an unsecured creditor who requires an indemnity from the licensee. Although assets of the licensee are not routinely required as collateral, the indemnity permits the bond issuer to call for collateral when he feels this is necessary. The bond provider will regularly monitor the situation of the licensee, checking whether he is making proper provision for decommissioning and what other assets he has available. There will be a limit to the value of a bond which a surety company would issue to a licensee. Unlike LOCs Surety Bonds do not need to be disclosed by the licensee and so they do not affect his credit rating. In the Gulf of Mexico the MMS decides what level of surety is required by a licensee. The bond issuer generally agrees to have the work

undertaken if the licensee is unable to fulfil his decommissioning work obligation. This is in contrast to the situation with the LOC scheme. In the present study to facilitate ready comparison with the typical LOC the bond was assumed to be required when field RNPV reached 150% of gross decommissioning costs.

Decommissioning Trust Funds or variants on them such as escrow accounts have become increasingly common over the last 15 years or so in different parts of the world. They involve the deposit of Funds by licensees into an alienated Fund (or escrow account) such that the contributions plus any net income earned by the Fund accrue to meet the decommissioning costs. It is again assumed for purposes of ready comparison with the other schemes that contributions commence when RNPV reaches 150% of gross decommissioning costs. The application of this simple formula sometimes meant that there was a shortfall in the Fund in relation to the decommissioning costs. In such cases the amount of the shortfall was relieved against tax (CT, SC, and PRT) as appropriate under current tax rules when the expenditures were incurred. The rules currently do not permit contributions to a Trust Fund to be tax deductible. This is a severe impediment to the use of this scheme. In other countries where they exist tax deductibility for the contributions exists. An example of a licensing system comparable to the UK is Namibia. In several other jurisdictions where Production Sharing Contracts are the norm contributions to Funds or escrow accounts are cost recoverable and tax deductible. Notable examples are Angola, Azerbaijan and Sakhalin.

In this study the cases where contributions to Trust Funds are (a) non-deductible and (b) deductible were both examined to highlight the large differences which emerge. In the UK discretionary trusts would be the relevant vehicles which would be employed to implement the Decommissioning Trust concept. Under

current tax rules the income from monies invested in such trusts would be taxed at 40%. Further, there would be a liability to Inheritance Tax after 10 years (at 6%) and when Funds were withdrawn to pay for the decommissioning work (at 20%). The application of Inheritance Tax in this manner would be so punitive as to inhibit the application of the whole scheme. It is also unattractive to investors if the contributions are not tax deductible.

In the study the modelling of the effects of the schemes was undertaken to reflect current market conditions. Thus for the LOC the fee was set at 1.5% of the decommissioning cost after taking into account the potential contribution from the net cash flows while the field is still producing. Thus the base for the LOC cost would increase as the field approached the cessation of production point as the field revenues decreased. The increase in the borrowing costs from the LOC scheme was assumed to be the base interest rate currently 4.75%. The base to which this applied was taken to be the same as for the fee for the LOC.

For the Surety Bond the costs were assumed to be 3.5% of the decommissioning cost again taking into account the contributions from remaining field net cash flows, with the cost payment thus increasing as the field net cash flows declined.

With the Trust Fund the assumption was that the contributions would follow the production curve after payments were triggered. Thus the contributions would decline from the trigger point onwards. For modelling purposes the size of the contributions was assumed to take into account the (net) income earned on the sums invested in the Fund. Discretionary Funds of this type are permitted to invest in a prudent selection of equities and bonds. Given the volatility of financial markets over the years it was decided to model two cases. Under the

first the return on the monies invested was a modest 4.75% in MOD terms and under the second it was 10% again in MOD terms.

Under current practice the DTI exercises discretion regarding which licensees it requests financial security from. This involves much judgement regarding the risks involved from the Government's viewpoint. The present study avoids these major judgements and concentrates on examining the comparative costs and effects of the schemes as applied to all fields in the UKCS from 2006 onwards. The analysis highlighted the comparative costs and effects of the schemes as seen from the viewpoint of investors and the Treasury as custodian of the taxpayer's interests. The costs involved are inevitably higher when applied to all fields, but they can be scaled down to reflect the application of the schemes on a selective basis.

The study highlighted not only the direct costs to investors and the Treasury but also the effects of lost production and field expenditures from changes in behaviour brought about by the introduction of the schemes. Lost production can emanate from two sources namely, (1) earlier cessation of production from developed fields from payment of the fees and perhaps Trust Fund contributions, and (2) marginal field developments deterred as a consequence of the payments. With respect to the Trust Fund it is not at all clear whether behaviour would change as a consequence of making payments into a Fund. While net cash flows are reduced when contributions are being made they are improved later when the decommissioning work is undertaken. Accordingly cases where behaviour is changed and unchanged were both considered.

The possible changes in behaviour with respect to cessation of production relate to the perceived need of the investor to avoid continuing production while making a net operating loss. Thus there could be an incentive following the

introduction of the schemes with the associated payments to accelerate cessation of production. Similarly, if a field or incremental project is very marginal there can be an incentive not to develop the project at all. These possibilities were examined in detail in the study.

The Government clearly needs to optimise its risks with respect to the decommissioning liability problem. The present study in effect shows the costs to investors and the Treasury resulting from the Government deciding to procure assurances against all the risks. This provides a base from which judgements can be made about the effects of the Government accepting different degrees of risk.

This issue comes up when mature assets are sold but the provisions of Section 29 of the Petroleum Act 1998 have not been withdrawn and/or threats of liability under Section 34 of the same Act remain. The sellers would clearly desire to be released from Section 29 and have the Section 34 powers removed, and these issues could affect their attitude to asset transactions which otherwise from a national viewpoint could be very desirable. The question of how financial security is best handled then arises. The present study gives insights into the pros and cons of different options.

Some key results of the study are now summarised. In Charts 168 and 169 the comparative cumulative gross costs of the LOC and Surety bond schemes are shown. Those for the LOC are much higher reflecting the extra cost of capital costs. Under the $30, 28 pence price they are over £10 billion while those for the Bond are well below £6 billion.
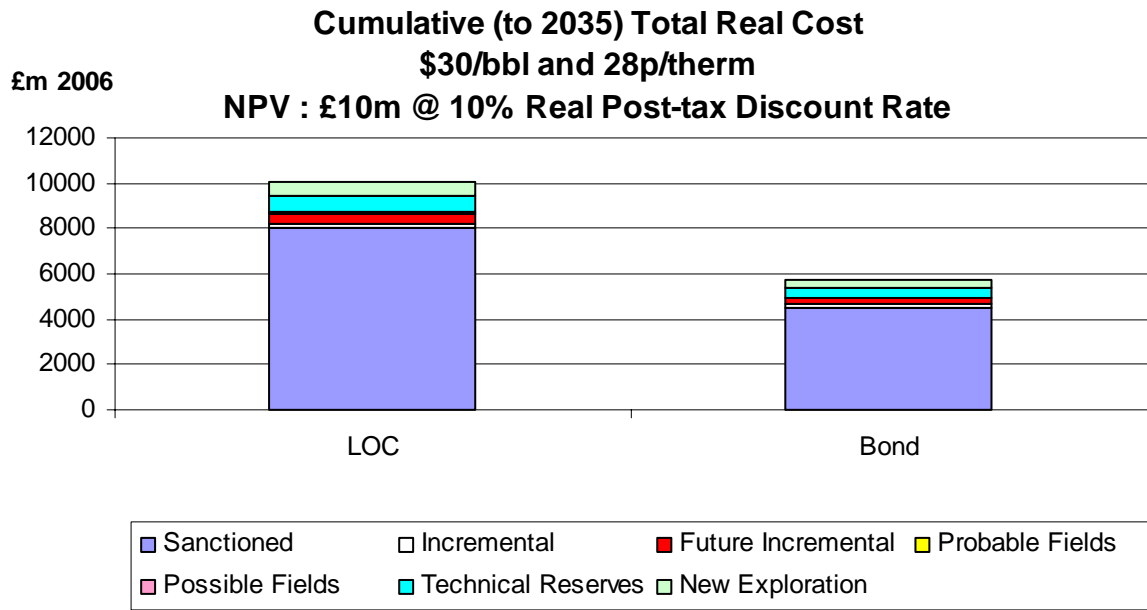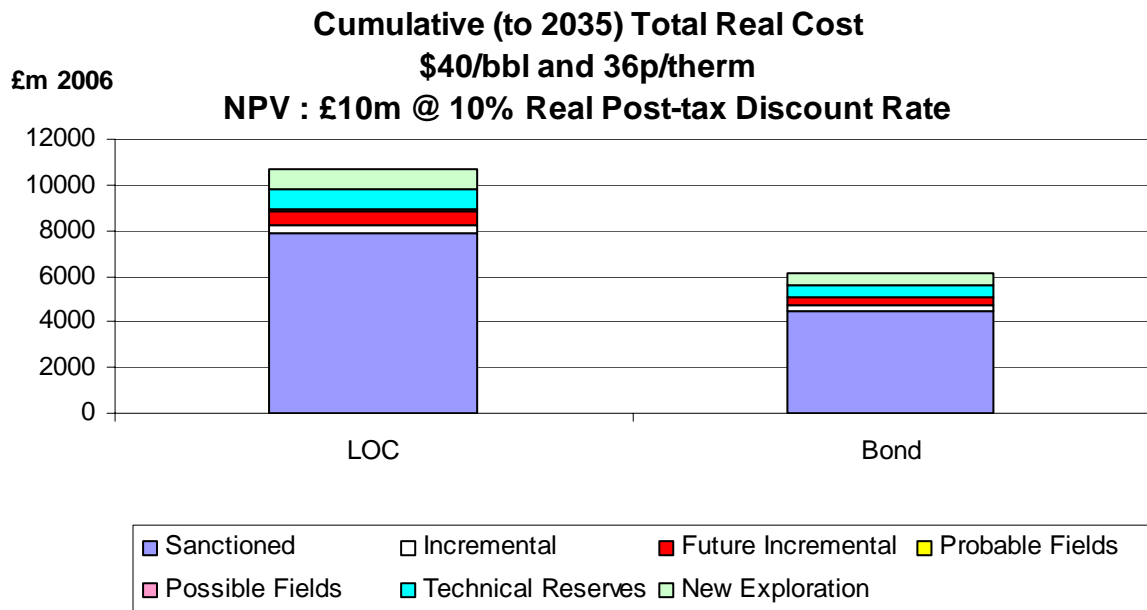
Chart 168

Cumulative (to 2035) Total Real Cost
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Chart 169

Cumulative (to 2035) Total Real Cost
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration

Charts 170 and 171 show the cumulative tax relief available for the LOC and Bond schemes. It is seen to be much greater for the Bond (over twice as much as for the LOC), reflecting the higher allowable costs.

Chart 170

Cumulative (to 2035) Total Real Relief
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves ■ New Exploration

Chart 171

Cumulative (to 2035) Total Real Relief
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: ■ Sanctioned □ Incremental ■ Future Incremental ■ Probable Fields ■ Possible Fields ■ Technical Reserves ■ New Exploration

Charts 172 and 173 show the cumulative changes in production which may occur with the introduction of the various schemes.

Chart 172

Cumulative (to 2035) Change in Production
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 173

Cumulative (to 2035) Change in Production
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate
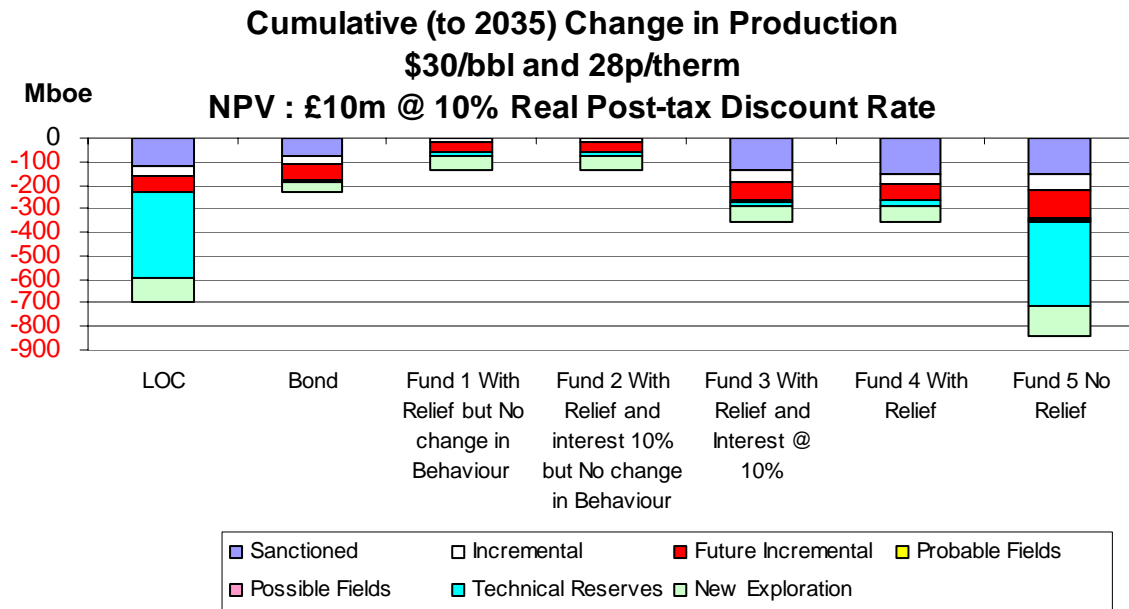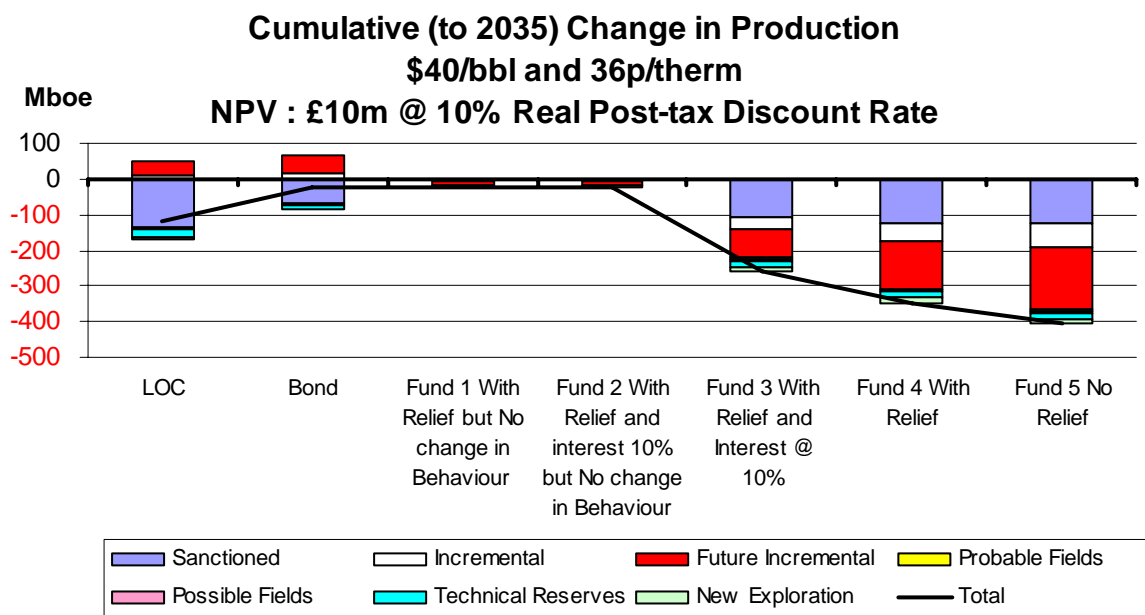
Under both price scenarios the potential cumulative change in production is greatest with the Fund scheme where the Fund obtains gross interest of 4.75%, there is no tax relief for Fund costs and behavioural changes regarding COP take place. There are significantly less new developments. The cumulative change in production is lowest with the Fund schemes where there is no change in behaviour (Fund 1 and Fund 2). It should be emphasised that the return to the Fund contributions is significant because of the substantial tax savings (50% and 75%) made.

Charts 174 and 175 show the cumulative potential changes in development expenditure. Again the greatest change is with the Fund scheme where the Fund obtains gross interest of 4.75%, there is no relief for Fund payments, and behavioural changes regarding COP take place. In the cases with income on Fund investments at 10% and no change in behaviour the change in development expenditures is very small.

Chart 174

Cumulative (to 2035) Change in Development Expenditure
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration, Total

Chart 175

Cumulative (to 2035) Change in Development Expenditure
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate
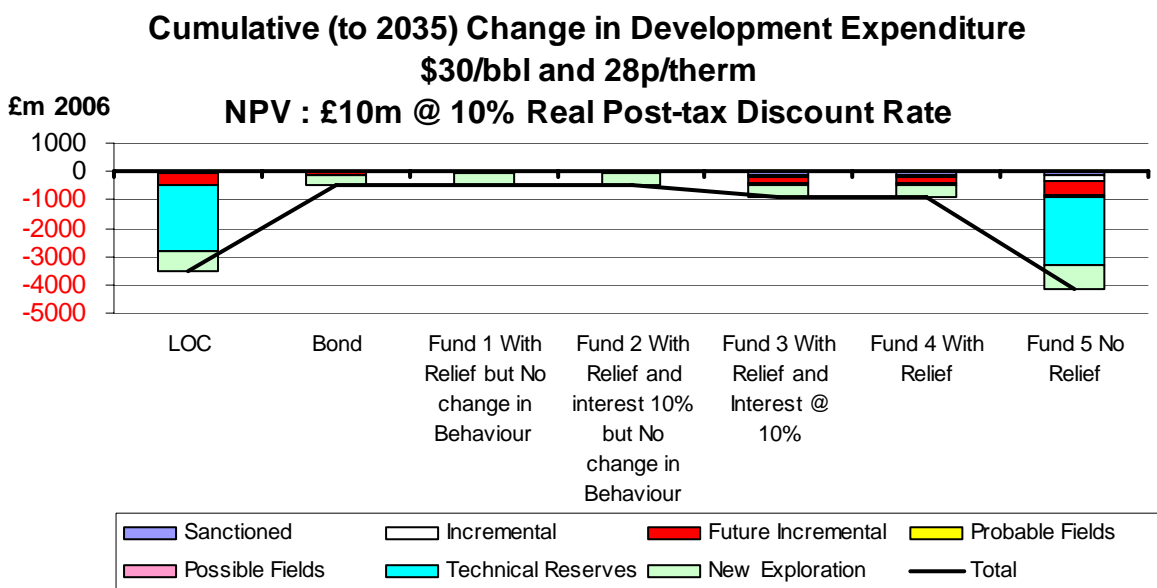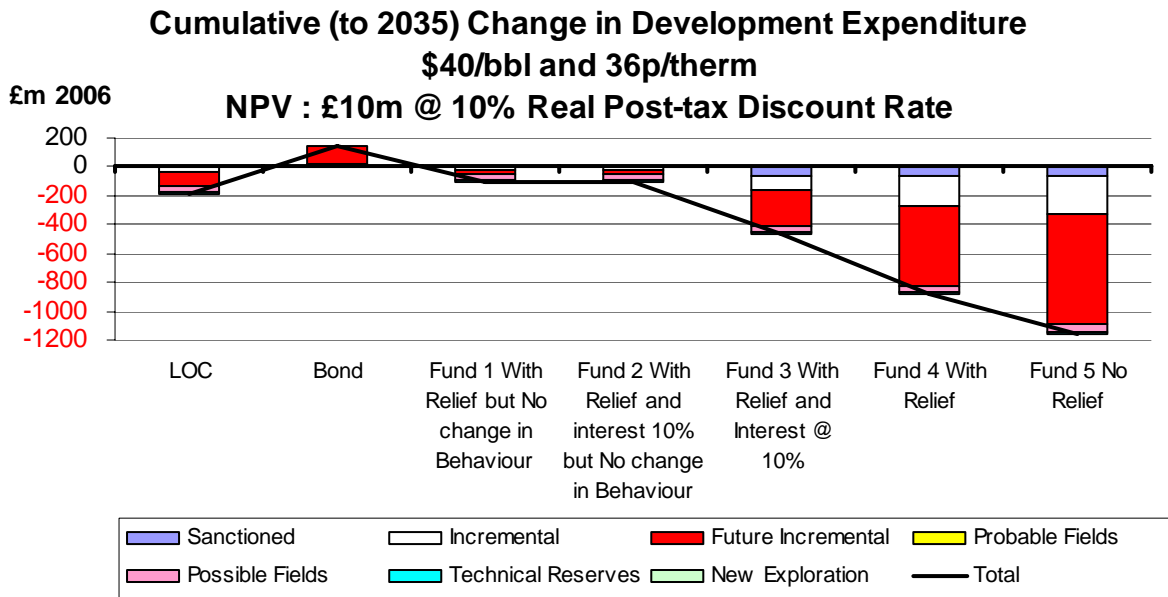
Charts 176 and 177 show the cumulative changes in operating expenditure. This is clearly with the LOC scheme and lowest with Fund schemes with no change in behaviour. The cumulative changes in production, development expenditure and operating expenditure are clearly lowest with these Fund schemes.
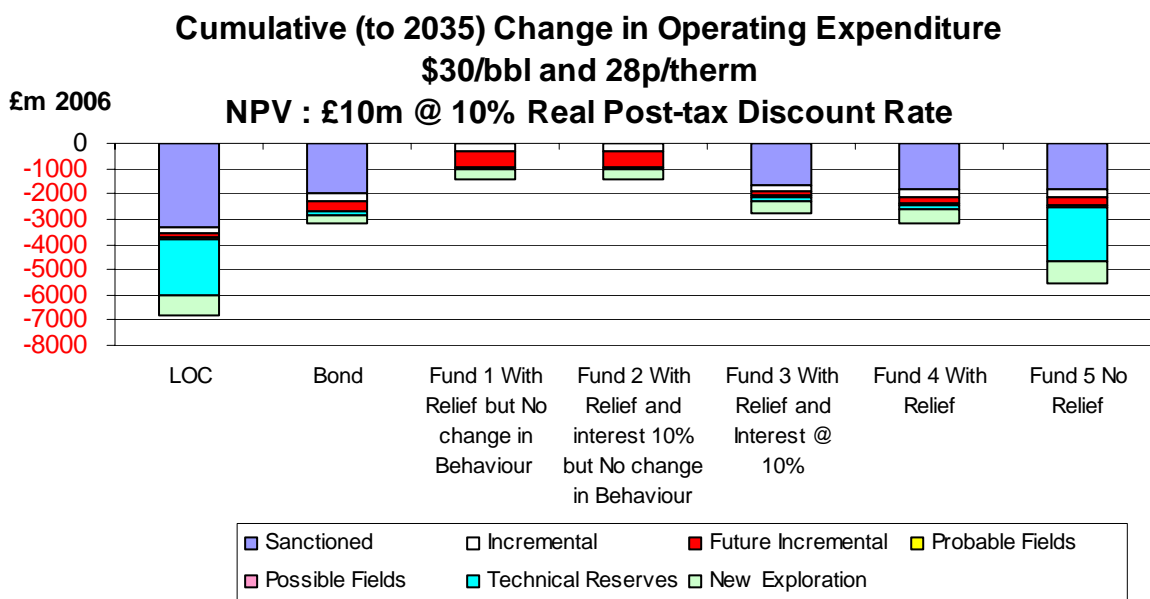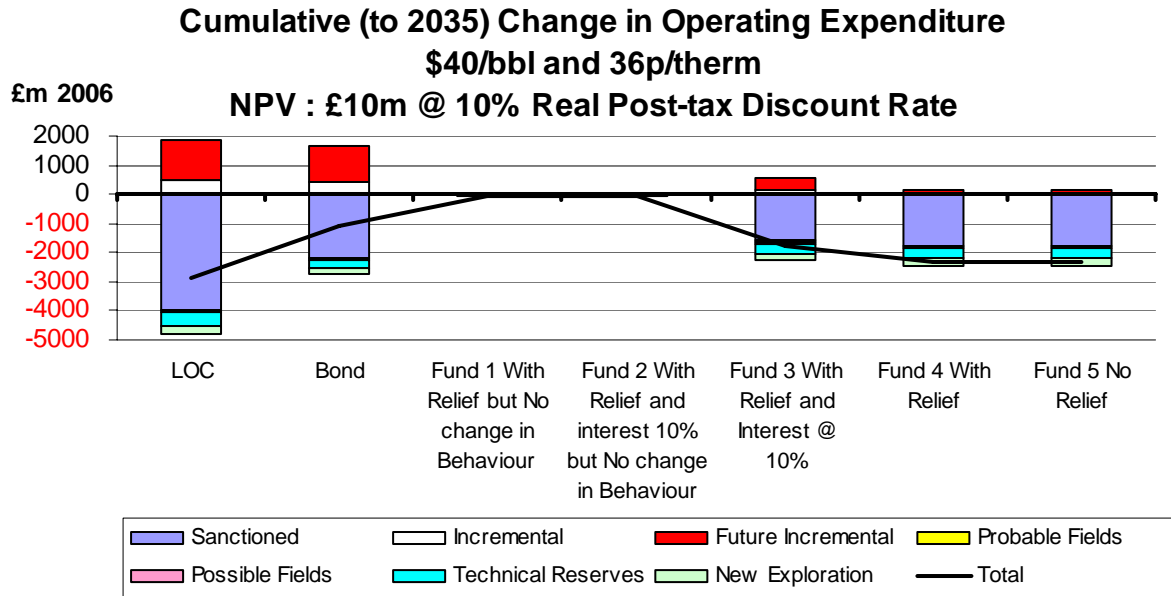
Chart 176

Cumulative (to 2035) Change in Operating Expenditure
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 177

Cumulative (to 2035) Change in Operating Expenditure
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Charts 178 and 179 show the net (post-tax) cost of the LOC and Bond Schemes to investors. The large difference emanates from the increase in the cost of capital under the LOC.
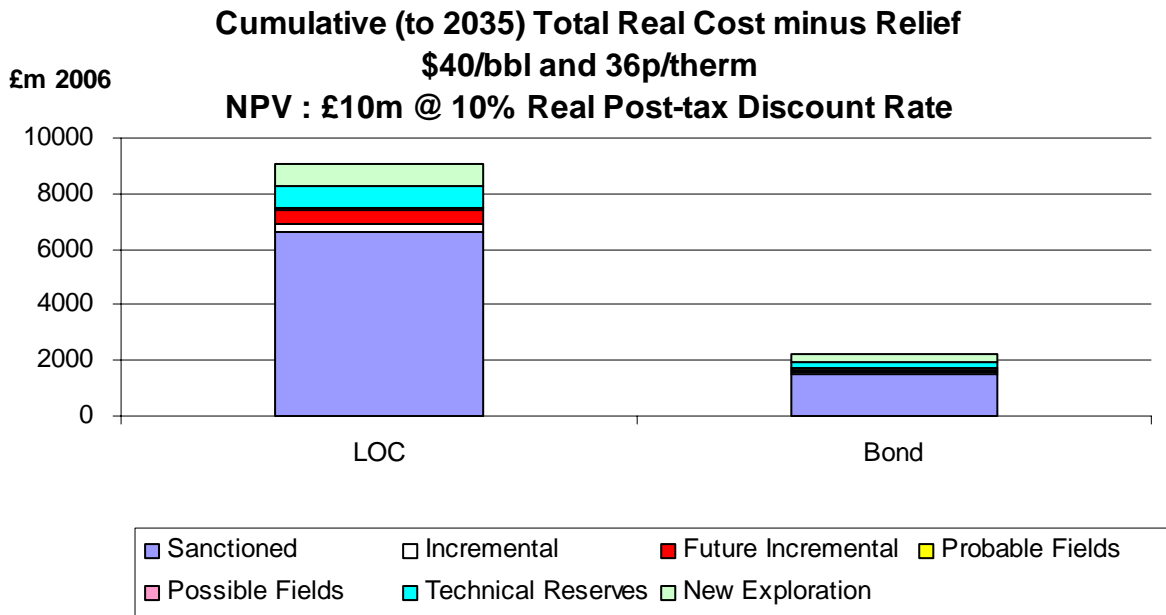
Chart 178

Cumulative (to 2035) Total Real Cost minus Relief
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 179

**Cumulative (to 2035) Total Real Cost minus Relief
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate**

£m 2006

Legend: ■ Sanctioned □ Incremental ■ Future Incremental □ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration
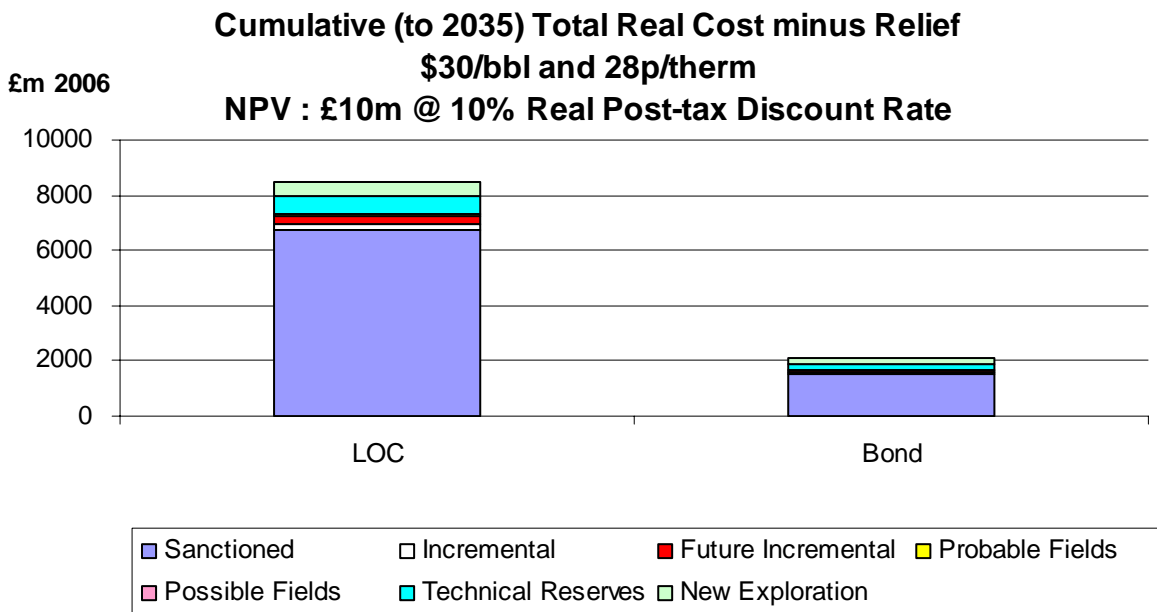
Charts 180 and 181 show the cumulative decommissioning costs under the 7 schemes. These are reduced when projects are deterred by the effects of the schemes. This happens less frequently under the $40, 36 pence price because fewer projects are marginal.

Chart 180

**Cumulative (to 2035) Decommissioning Cost
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate**

£m 2006

Legend: ■ Sanctioned □ Incremental ■ Future Incremental □ Probable Fields ■ Possible Fields ■ Technical Reserves □ New Exploration ▬ Total

Chart 181

Cumulative (to 2035) Decommissioning Cost
$40/bbl and 36p/therm
£m 2006   NPV : £10m @ 10% Real Post-tax Discount Rate
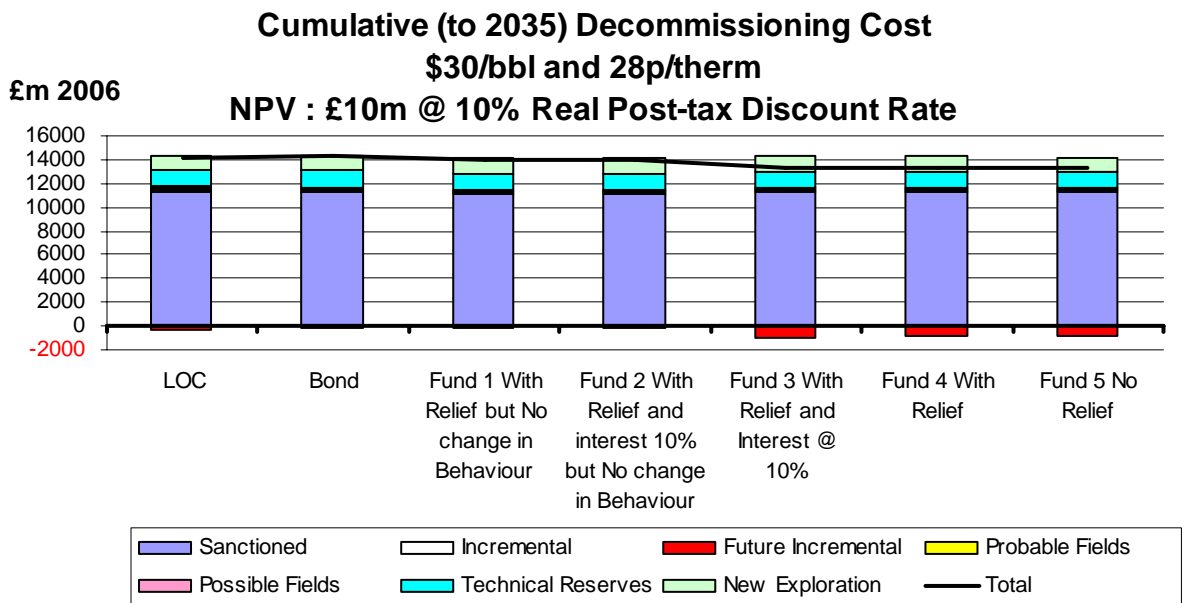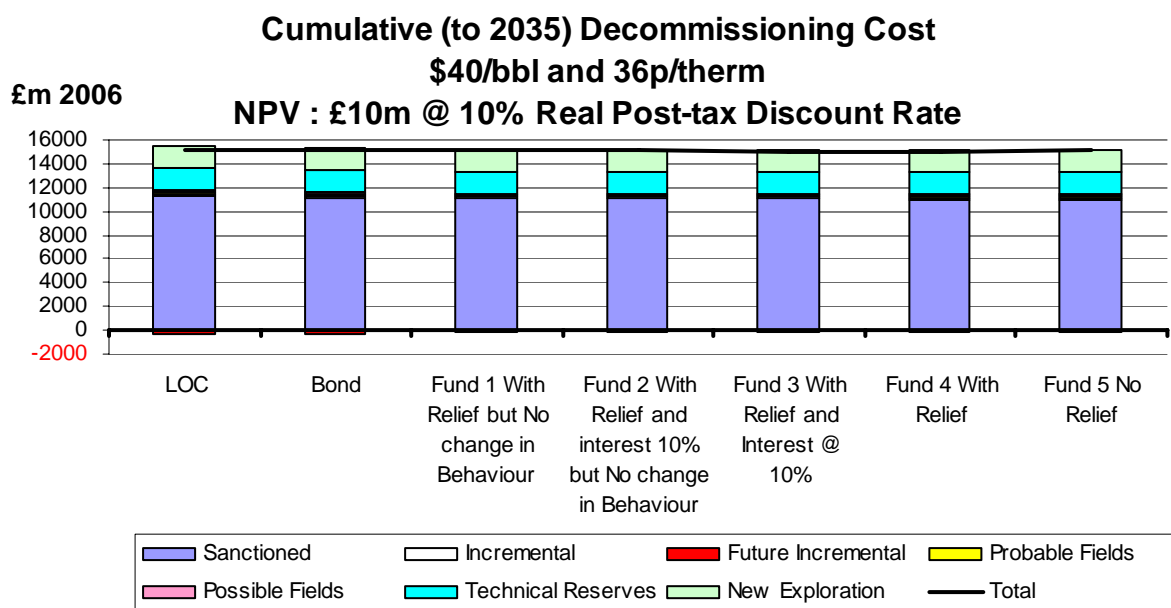
Charts 182 and 183 show the potential cumulative decommissioning relief. It should be noted that the <u>total amount</u> of relief is a function not only of the working of the tax system but of the total number of projects which proceed. As noted above, the various schemes do impact on the number of viable projects, especially under the $30, 28 pence case when many are very marginal. The highest total relief is under the Bond scheme and the lowest total relief is with the Fund scheme where there is no change in behaviour and the Fund obtains income. It should be noted that the interest on Fund income reduced the required contributions and thus the aggregate value of the tax relief on these contributions.

Chart 182

Cumulative (to 2035) Decommissioning Relief
$30/bbl and 28p/therm
£m 2006
NPV : £10m @ 10% Real Post-tax Discount Rate

| Sanctioned | Incremental | Future Incremental | Probable Fields |
| Possible Fields | Technical Reserves | New Exploration | Total |

Chart 183

Cumulative (to 2035) Decommissioning Relief
$40/bbl and 36p/therm
£m 2006
NPV : £10m @ 10% Real Post-tax Discount Rate

| Sanctioned | Incremental | Future Incremental | Probable Fields |
| Possible Fields | Technical Reserves | New Exploration | Total |

Charts 184 and 185 show the cumulative change in tax revenues excluding the effects of LOC or Bond relief and excluding the tax on Fund interest. The changes thus reflect a combination of the reliefs and the effects of the schemes on project developments and COP dates. If projects are deterred tax revenues are lost and tax reliefs on those projects do not become necessary.

Chart 184

Cumulative (to 2035) Change in Tax Revenue
(Tax (+ LOC/Bond relief or - tax on interest) - Base)
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 185

Cumulative (to 2035) Change in Tax Revenue
(Tax (+ LOC/Bond relief or - tax on interest) - Base)
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate
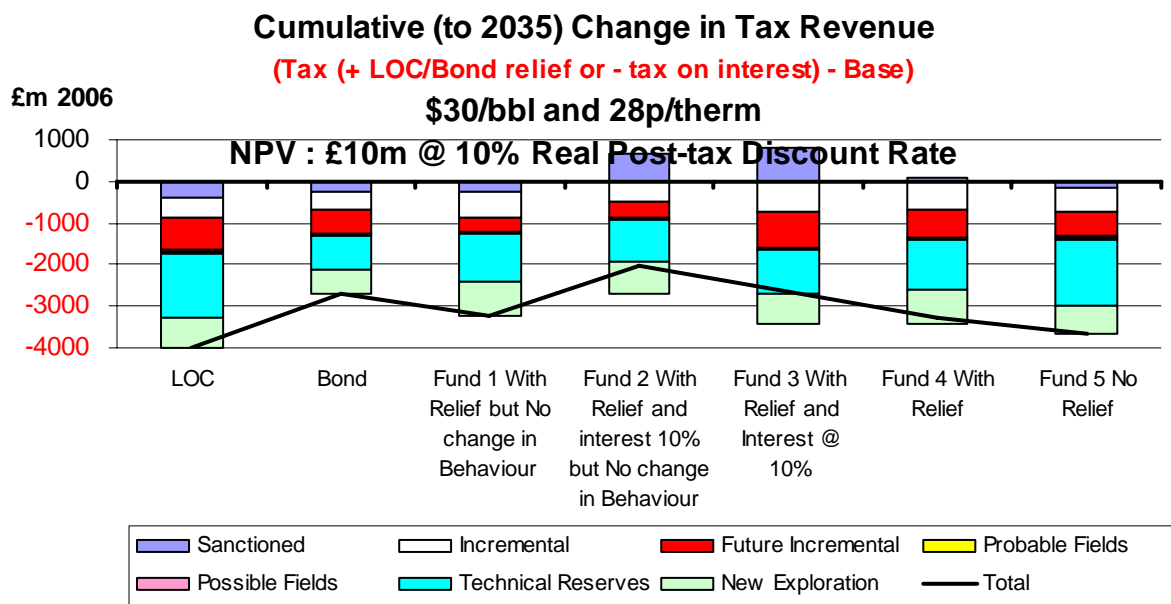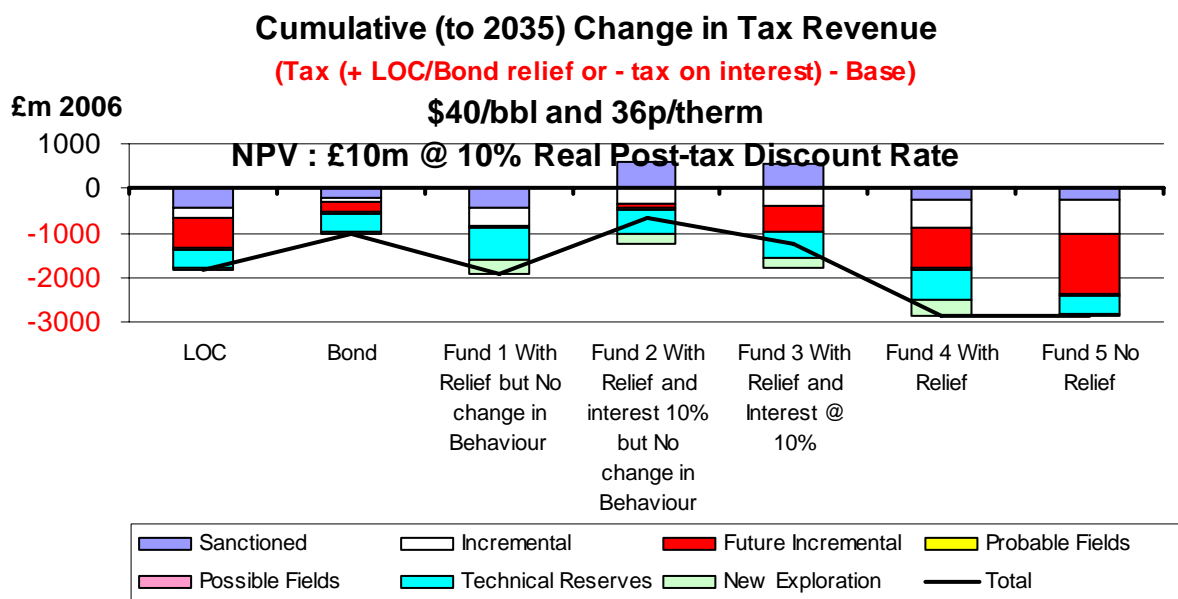
Charts 186 and 187 show the potential cumulative changes in tax revenues including the effects of LOC or Bond cost reliefs and the tax on Fund interest. For both the medium and the high price the Fund schemes which gain interest at 10% give a positive change in tax revenue and the Bond scheme gives the largest negative change in tax revenues. Charts 186 and 187 reflect the net cost to HMRC of each of the schemes.
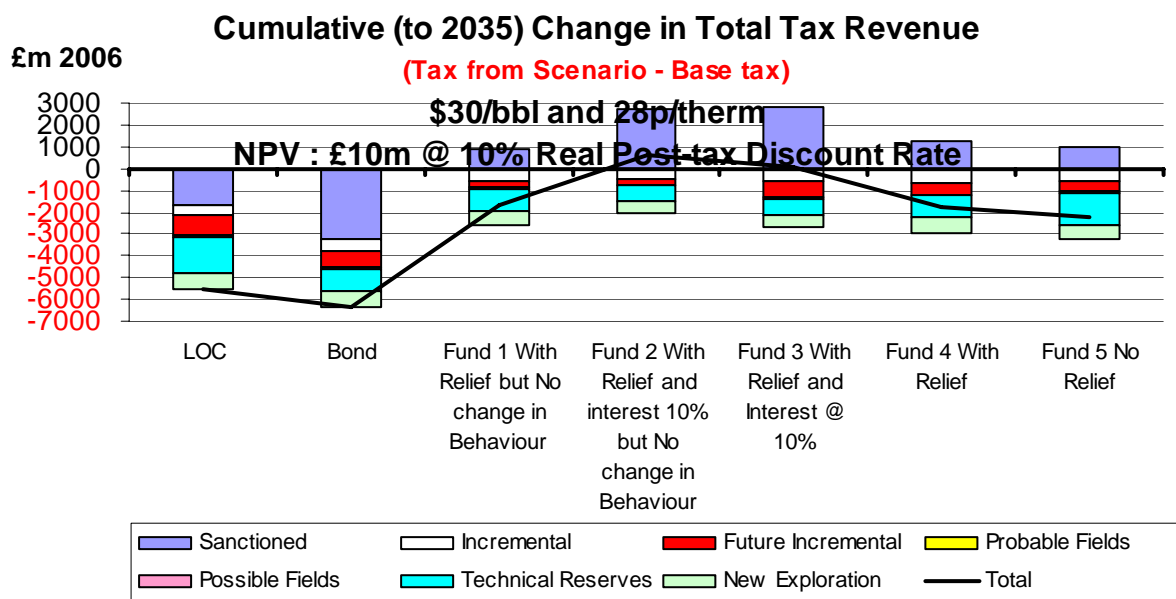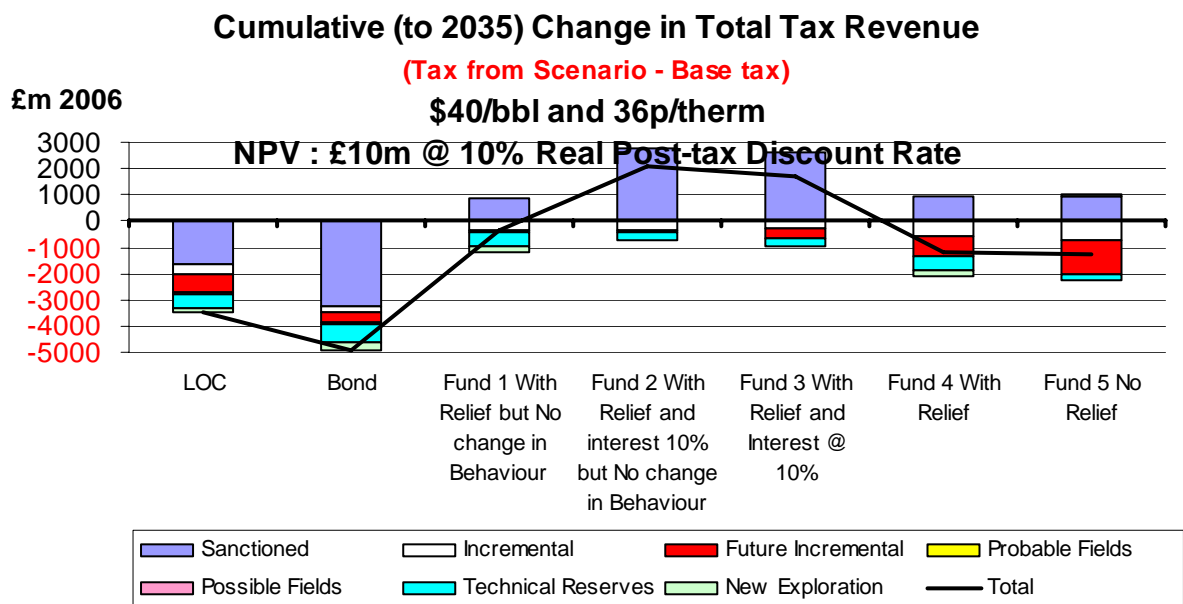
Chart 186

Chart 187

Charts 188 and 189 show the gross decommissioning costs to the industry emanating from of each of the schemes. The LOC scheme is by far the costliest and the Fund schemes with Fund interest at 10% are the least costly.
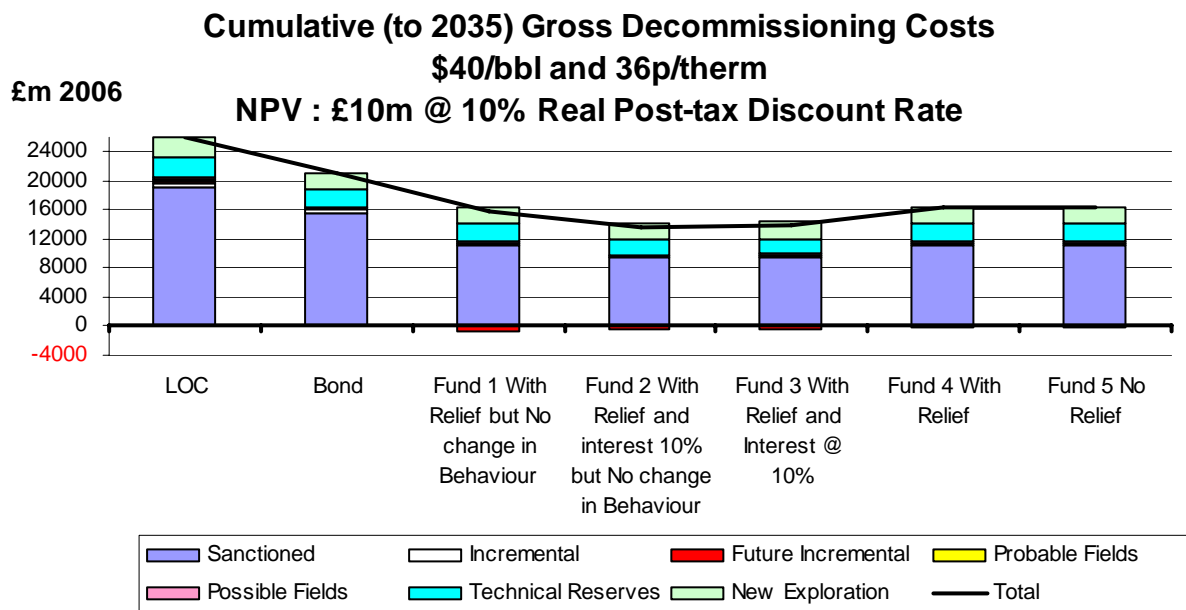
Chart 188

Cumulative (to 2035) Gross Decommissioning Costs
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 189

Cumulative (to 2035) Gross Decommissioning Costs
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate
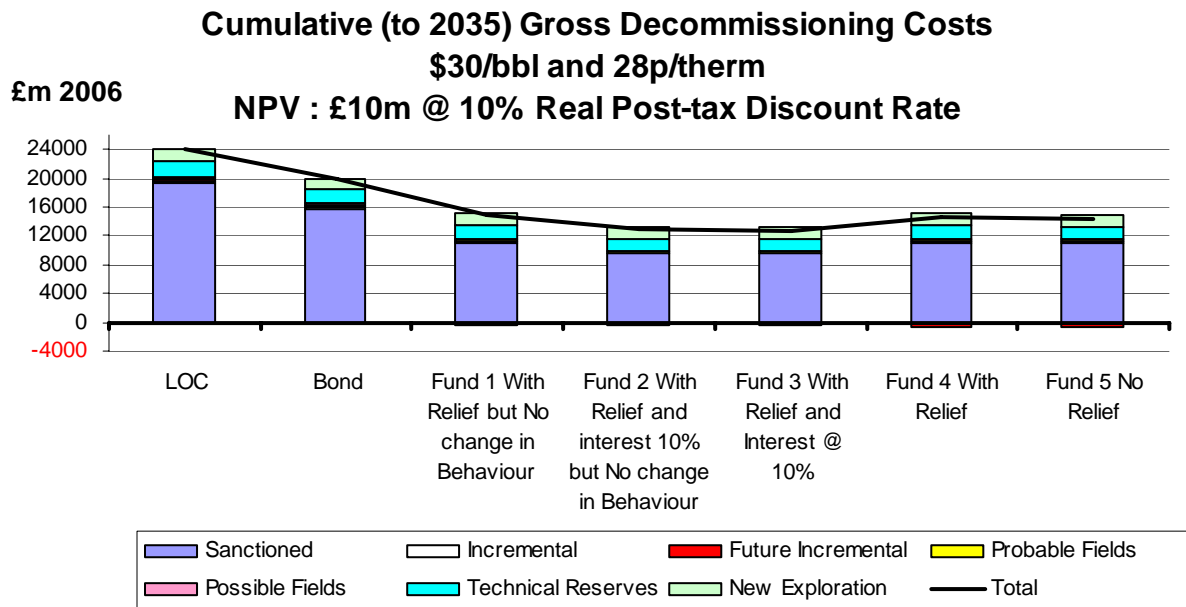
Charts 190 and 191 show the cumulative net decommissioning tax relief from each of the schemes. They show the decommissioning relief minus the tax on interest i.e. the comparative cost of decommissioning to HMRC under each of the schemes. The relief is highest with the Bond scheme and lowest with the Fund schemes where the Fund earns interest at 10%.
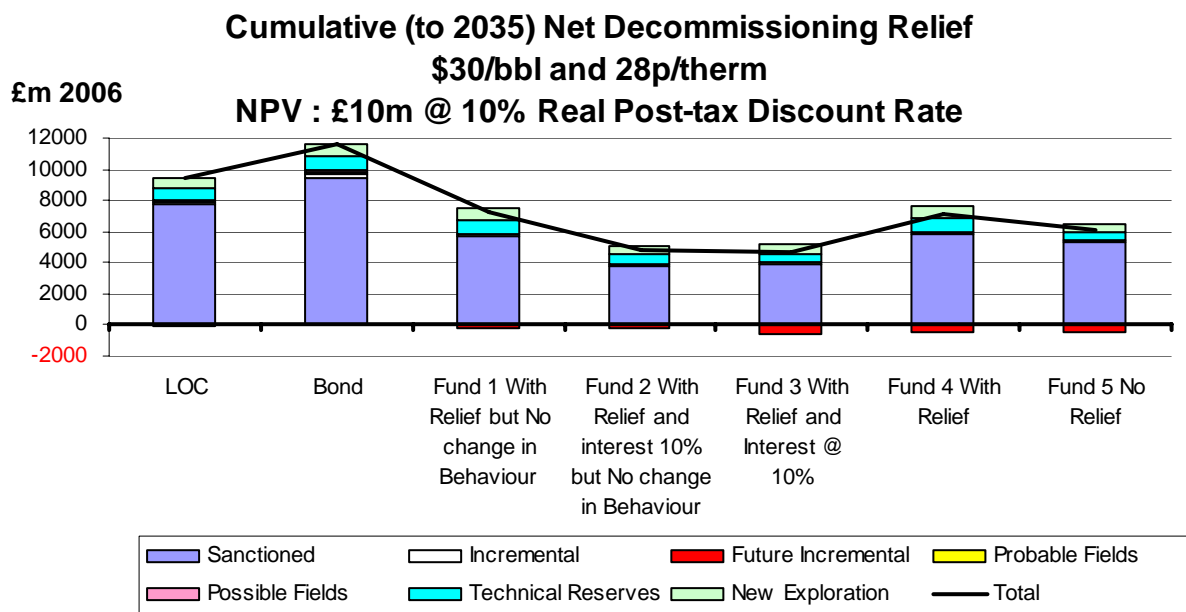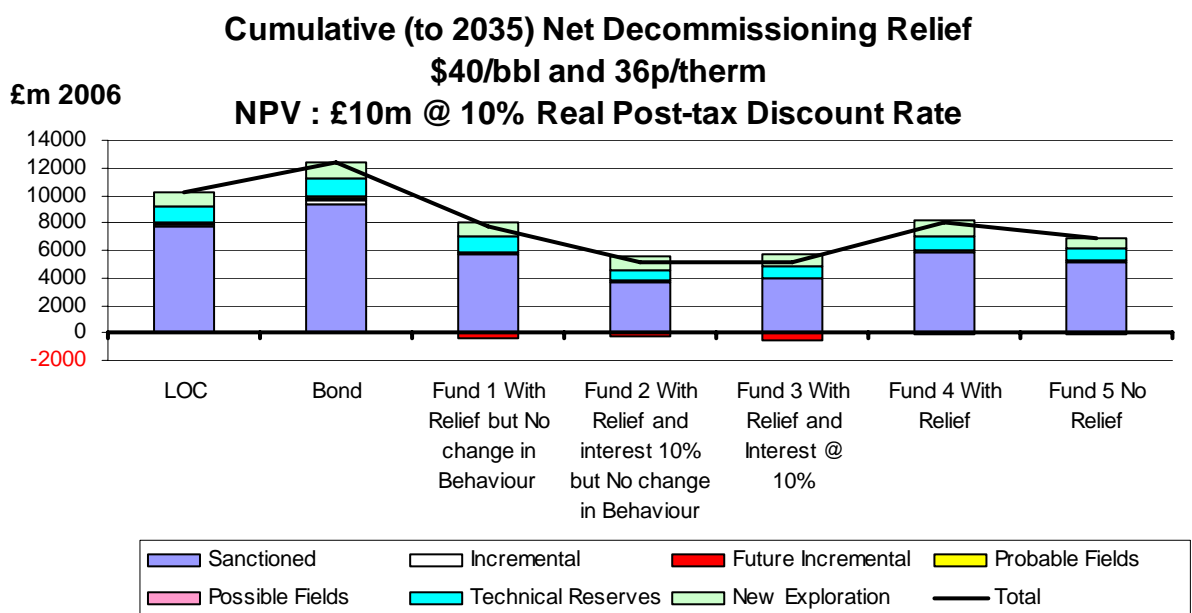
Chart 190

Cumulative (to 2035) Net Decommissioning Relief
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration, Total

Chart 191

Cumulative (to 2035) Net Decommissioning Relief
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

£m 2006

Legend: Sanctioned, Incremental, Future Incremental, Probable Fields, Possible Fields, Technical Reserves, New Exploration, Total

Charts 192 and 193 show the total net decommissioning cost to licensees after tax relief. The LOC scheme is clearly the most expensive. The Fund schemes with tax relief are generally the cheapest.
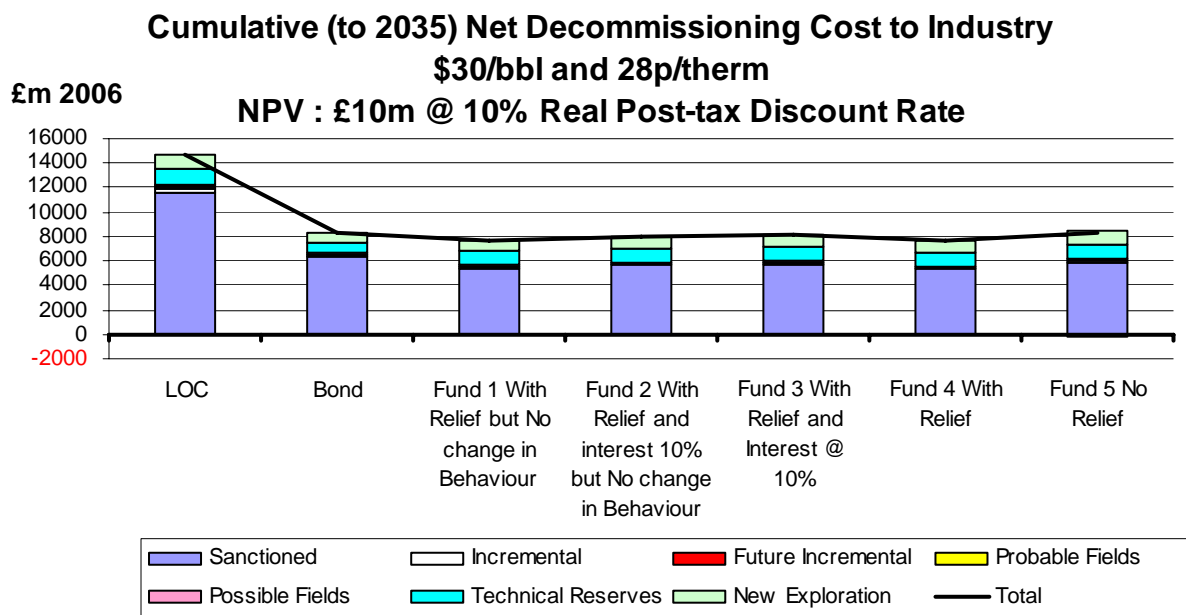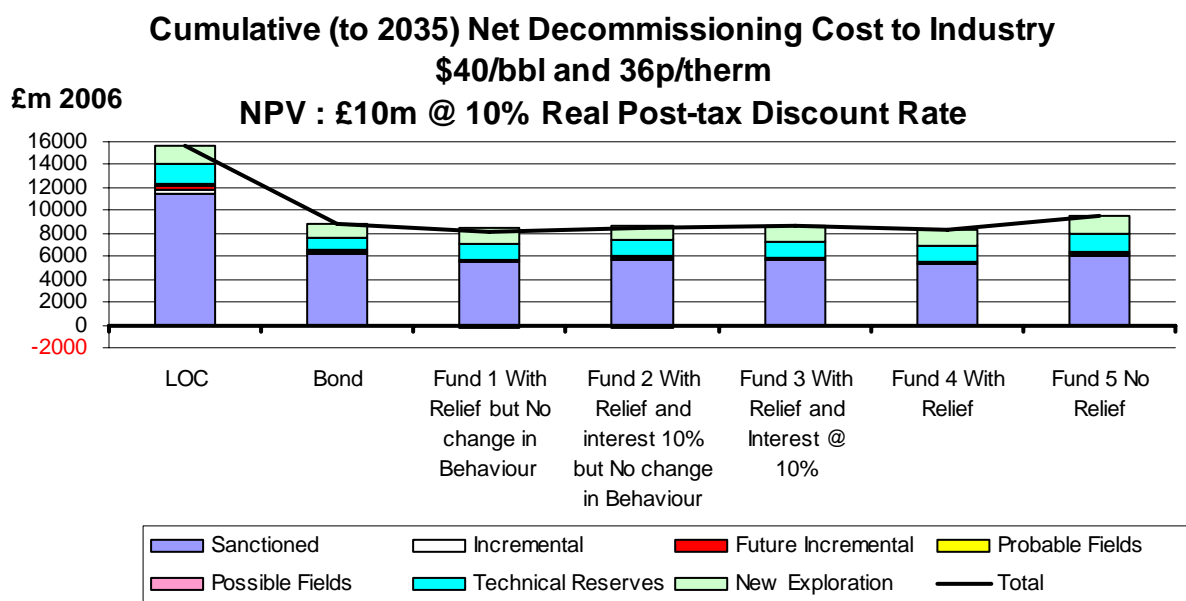
Chart 192

Cumulative (to 2035) Net Decommissioning Cost to Industry
$30/bbl and 28p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

Chart 193

Cumulative (to 2035) Net Decommissioning Cost to Industry
$40/bbl and 36p/therm
NPV : £10m @ 10% Real Post-tax Discount Rate

The choice of scheme can be determined in terms of economic efficiency and cost to the Exchequer. Economic efficiency includes any disincentive or distorting effects such as loss of production from the results of any of the schemes. From the viewpoint of the Government the costs of schemes should include not only the direct costs of tax reliefs but the loss of tax revenues from production foregone. Any loss of investment also adversely affects the contracting sector.

The LOC scheme is an "extra" cost and as such it may accelerate the decommissioning date and/or it may make some projects or field developments uneconomic (i.e. they do not pass the hurdle rate). Under the medium price, 698 Mboe may fail to be produced, a large proportion may fail to be developed because the LOC cost makes the development fail the economic hurdle. The total cumulative negative effect in tax revenues from the uptake of the LOC scheme and the effects that the scheme has on behaviour may be as much as £5521m by 2035. Under the high price 119 Mboe may be lost, much of which results from the LOC cost making the fields in question fail the economic hurdle. The cumulative reduction in tax revenues from the uptake of the scheme may amount to £3466m in the period to 2035.

The Surety Bond scheme, like the LOC, is an "extra" cost and as such it may also, albeit to a lesser extent, accelerate the decommissioning date and/or it may render some marginal projects or field developments uneconomic by reducing the NPVs below the hurdle. Under the medium price the net Bond cost may result in 229 Mboe not being produced, much of which may fail to be developed because the Bond cost makes the development fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the Bond scheme and the effects that the scheme has on behaviour may amount to a reduction of £6381m. Under the high price the corresponding figures 23Mboe may not be

produced, most of which is lost as a result of the Bond cost making the fields in question fail the economic hurdle. The cumulative loss in tax revenue from the uptake of the scheme may amount to £4889m. The Bond scheme is less of a burden on the industry than the LOC scheme but it is a larger burden on HMRC.

The Fund schemes differ from the LOC and Bond schemes in that they are not extra costs of decommissioning but advance payments of these costs. The decommissioning cost to the industry which has to be paid directly is less than under the current arrangements or the LOC and Bond schemes because of the income earned by the Fund from the contributions. It should also be stressed that, while the contributions are made prior to the decommissioning expenditures tax relief is immediately available in some of the schemes examined. This can produce a high return because of the value of the tax relief (50% or 75%), and the increased price which could be obtained by the seller in asset transactions.

With Fund 1 it was assumed that there would be no behavioural changes regarding the decommissioning date because of the Fund. It is still possible that some new investments would fail the hurdle because of the "early" payments for decommissioning costs. The interest rate assumed in Fund 1 was 4.75%. Under the medium price cumulatively to 2035, 133 Mboe may fail to be produced, most of which may fail to be developed because the Fund's requirement for "early" payment makes the project fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the Fund 1 scheme may amount to a reduction of £1706m. Under the high price the corresponding loss of production is 23 Mboe, of which most is lost as a result of the early Fund payments cost making the fields in question fail the economic hurdle. The cumulative change in tax revenues may amount to a reduction of £318m.

Fund 2 is as Fund 1 except that the Fund achieves income at 10%. While the decommissioning cost under Funds 1 and 2 are the same there is £1290m <u>less</u> given in decommissioning relief with Fund 2 compared to Fund 1 because the income component of Fund 2 is higher, and so the payments into the Fund which receive tax relief are less. Under the medium price with Fund 2, cumulatively to 2035, 133 Mboe may fail to be produced, most of which fails to be developed because the Fund's requirement for contributions makes the field fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the Fund 2 scheme may amount to an <u>increase</u> in tax revenue of £621m because of the tax on Fund income. Under the high price there is £1335m less given in decommissioning relief compared to that given for Fund 1. The corresponding figures cumulative change in tax revenues may amount to an increase of £2094m.

Fund 3 is as Fund 2, with Fund interest at 10%, but the Fund payments may affect behaviour regarding the timing of decommissioning. Under the medium price, cumulatively to 2035, 360 Mboe may fail to be produced, much of which may fail to be developed because the Fund's requirement for "early" payment makes the field fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the scheme may amount to an increase of £106m because of the tax on Fund interest. Under the high price the corresponding figures for loss of production are 260 Mboe, a substantial share of which is lost as a result of the early Fund payments making the fields in question fail the economic hurdle. The cumulative change in tax revenues may amount to an increase of £1710m.

Fund 4 is as Fund 1, with Fund interest at 4.75%, but the Fund payments may affect behaviour regarding the timing of decommissioning. Under the medium price, cumulatively to 2035, 358 Mboe may fail to be produced, much of which results from "early" payments making the field fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the scheme may amount to a decrease in tax revenues of £1753m. Under the high price the corresponding figures for loss of production are 346 Mboe, much of which is lost as a result of the early Fund payments making the fields in question fail the economic hurdle rate and the cumulative change in tax revenues may amount to a decrease of £1207m.

Fund 5 is as Fund 4, with Fund interest at 4.75%, with the Fund payments affecting behaviour regarding the timing of decommissioning and no relief given for Fund contributions. Decommissioning relief is given on the decommissioning cost when the cost is incurred. The aggregate relief given for decommissioning costs will be higher than that given for the Fund schemes. The present value of the total real decommissioning relief will be lower because it is given later than under the other schemes which gives relief on Fund contributions. Under the medium price cumulatively to 2035, 843 Mboe may fail to be produced, most of which fail to be developed because the Fund's requirement for "early" payment makes the field fail the economic hurdle. The total cumulative change in tax revenue from the uptake of the Fund 4 scheme amounts to a decrease in tax revenues of £2236m. Under the high price the corresponding figures for loss of production are 407 Mboe, much of which are lost as a result of the early Fund payments making the fields in question fail the economic hurdle. The cumulative change in tax revenues amount to a decrease of £1284m.

The choice of schemes has to consider the advantages and disadvantages discussed above. The LOC scheme is generally more expensive to UK plc than the other two. The advantages of the Trust Fund scheme include the facilitation of asset transactions in mature fields. Their attraction does depend in part on the return achieved on the invested Fund monies, but it is also noteworthy that from the viewpoint of the licensee the return on the alienated funds is substantially greater than this because of the relief of the contributions against tax at 50% or 75% (depending on whether PRT is being paid). An economically efficient Trust Fund scheme requires tax deductions for the contributions. Similarly the imposition of Inheritance Tax makes it non-viable. From Government's perspective the direct costs are higher in the early years but the net return from the increased production and tax on interest could well compensate for this in the long run.

The study has concentrated on the effects of the various schemes applied across the board. The extent to which the application of the schemes should be selective and thus the extent to which the Government should accept the financial liability risks is for separate consideration.