

<b>Title:</b> Future Management of the Compulsory Stockholding Obligation in the UK  IA No: DECC0117  <b>Lead department or agency:</b> Department of Energy and Climate Change	<b>Impact Assessment (IA)</b>		
	<b>Date:</b> 08/07/2013		
	<b>Stage:</b> Final		
	<b>Source of intervention:</b> Domestic		
	<b>Type of measure:</b> Primary legislation		
<b>Contact for enquiries:</b> David Rolfe / Apurva Shah / Sara Davies			

<b>Summary: Intervention and Options</b>	<b>RPC:</b> GREEN
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**Cost of Preferred (or more likely) Option**

Total Net Present Value	Business Present Value	Net	Net cost to business per year (EANCB in 2009 prices)	In scope of One-In, One-Out?	Measure qualifies as
£13.7m	£13.7m		£-0.61m	Yes	Zero Net Cost

**What is the problem under consideration? Why is government intervention necessary?**

The UK is required by the EU and the IEA to hold emergency stocks of oil products to release to market in the event of global short-term oil supply disruptions, known as the compulsory stocking obligation (CSO). The amount of stocks the UK is required to hold is forecast to rise in the future as UK Continental Shelf production declines. To satisfy these obligations, currently Government issues individual directions to business. The present system prohibits industry from working together to collectively manage the UK's obligation, as the UK does not have a Centralised Stocking Entity (CSE). There are concerns the present system creates underinvestment in adequate storage, and may harm the ability of the UK to meet the CSO in the long-run, posing a long-run risk to resilience.

**What are the policy objectives and the intended effects?**

The policy objective is to ensure that the CSO continues to be met as the overall obligation increases in the future; so that the UK both holds and can deploy sufficient emergency stocks to mitigate the detrimental impacts on the UK, EU and IEA members of any global oil supply disruption. This supports Government's objectives to improve energy resilience.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

*Option 1: "do nothing".* The UK's CSO continues to be met through issuing individual directions on obligated companies.

*Option 2: Government Strategic Reserve.* Companies remain obligated to meet the current CSO but Government manages the total increase in the overall stocking obligation by purchasing physical stocks and tickets to meet the obligation.

*Option 3: Private Stockholding Agency.* Government facilitates the setting up of a private agency which obligated companies will use to manage the increase in obligation, by purchasing stocks and tickets. The agency would be a 'not for profit' body funded by contractual fees in proportion to stock volumes delegated and would have the potential to manage the entirety of the obligation. This option has no cost to the exchequer.

*Option 4: Government top slice option.* This is a middle ground between Government Strategic reserve and a private stockholding agency, where Government owns stocks through the agency.

Option 3 is the preferred option as it presents welfare benefits without a cost to the exchequer. We believe a private stockholding agency will increase investment certainty and better manage the aggregate obligation by exploiting economies of scale and scope.

<b>Will the policy be reviewed?</b> It will be reviewed <b>If applicable, set review date:</b> April 2015						
Does implementation go beyond minimum EU requirements?				N/A		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.		<b>Micro No</b>	<b>&lt; 20 No</b>	<b>Small No</b>	<b>Medium Yes</b>	<b>Large Yes</b>
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)				<b>Traded:</b> n/a		<b>Non-traded:</b> n/a

*I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.*

Signed by the responsible Minister: \_\_\_\_\_ Date: \_\_\_\_\_

# Summary: Analysis & Evidence

# Policy Option 2

Description: Government Strategic Reserve

## FULL ECONOMIC ASSESSMENT

Price Base Year 2012	PV Base Year 2012	Time Period Years 30	Net Benefit (Present Value (PV)) (£m)	
				Best Estimate: £19.3m

COSTS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition) (Constant Price)	Annual (Constant Price)	Total (Present Value)	Cost
Best Estimate	£1m		£1m		£19.4m	

### Description and scale of key monetised costs by 'main affected groups'

As under option 3 (see p3), the main costs of option 2 are the initial start-up costs of setting up the agency, valued at £1m PV, and the ongoing operating costs of the agency, valued at £18.4m PV. Ongoing running costs are staffing costs and associated overheads.

### Other key non-monetised costs by 'main affected groups'

While costs are likely to be as under option 3, a public agency may incur higher costs than a private agency.

BENEFITS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition) (Constant Price)	Annual (Constant Price)	Total (Present Value)	Benefit
Best Estimate	n/a		£2.9m		£38.7m	

### Description and scale of key monetised benefits by 'main affected groups'

Under option 2, there is a reduction in the costs of managing the CSO as the "contingency buffer" and therefore storage costs decrease, valued at £18.2m PV. This arises from the aggregate obligation being potentially lower than the sum of the stock, over and above the CSO, held by individual companies. In addition, an agency may be able to make use of a lower cost of capital, with an associated saving in investment costs of £1.4m. Thirdly, storing oil has an associated opportunity cost and by storing less this is reduced, with a value of £13.6m. Finally under this option Government purchases oil from industry and ownership of the asset changes hands. The opportunity cost faced by Government of storing oil is lower than that of industry and hence there is an additional future benefit stream valued at £5.5m in PV (this is the only monetised benefit that differs between options and relates to the entire CSO).

### Other key non-monetised benefits by 'main affected groups'

A Government Reserve may be able to reduce the risk of non-compliance and so increase resilience when faced with global supply disruptions as Government has direct control over the supply of some stock.

### Key assumptions/sensitivities/risks

Discount rate (%) 3.5

A key assumption in the analysis is the future split between physical stocks and the ticket market, given the inherent uncertainties. Sensitivity analysis of changing the ratio of tickets to physical product held each year by 10% yields a change in NPV of +£6.2m Refer to paragraph 80 for a full list of sensitivities tested.

## BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0.9	Benefits: £1.7	Net: £0.9	Yes	Zero Net Cost

# Summary: Analysis & Evidence

Policy Option 3

Description: Private Stockholding Agency

## FULL ECONOMIC ASSESSMENT

Price Base Year 2012	PV Base Year 2012	Time Period Years 30	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: £13.7m

COSTS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition)	Annual (Constant Price)	Total (Present Value)	Cost
<b>Best Estimate</b>	£1m		£1m		<b>£19.4m</b>	

### Description and scale of key monetised costs by 'main affected groups'

The main costs of option 3 are the initial start-up costs of setting up the agency, valued at £1m PV, and the ongoing operating costs of the agency, valued at £18.4m PV. Ongoing running costs are staffing costs and associated overheads.

### Other key non-monetised costs by 'main affected groups'

n/a

BENEFITS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition)	Annual (Constant Price)	Total (Present Value)	Benefit
<b>Best Estimate</b>	n/a		£2.5m		<b>£33.1m</b>	

### Description and scale of key monetised benefits by 'main affected groups'

Under option 3, there is a reduction in the costs of managing the CSO as the "contingency buffer" decreases, valued at £18.2m PV. This arises from the aggregate obligation being potentially lower than the sum of the stock, over and above the CSO, held by individual companies. In addition, an agency may be able to make use of a lower cost of capital, with an associated saving in investment costs of £1.4m. Thirdly, storing oil has an associated opportunity cost and by storing less this is reduced, with a value of £13.6m.

### Other key non-monetised benefits by 'main affected groups'

An agency may be able to reduce the risk of non-compliance and so increase resilience when faced with global supply disruptions. In addition, this option would offer increased resilience in the event of a closure of a refinery as the agency manages the obligation centrally and would adjust the fee to compensate rather than companies being forced to accommodate the change in their obligation themselves.

### Key assumptions/sensitivities/risks

Discount rate (%) 3.5

A key assumption in the analysis is the future split between physical stocks and the ticket market, given the inherent uncertainties. Sensitivity analysis of changing the ratio of tickets to physical product held each year by 10% yields a change in NPV of +-£6.2m Refer to paragraph 80 for a full list of sensitivities tested. There is a risk an agency would not have an incentive to minimise costs as these are recovered through a levy on industry. However this risk will be mitigated through the governance structure of the agency. See para 105 for full description of risks.

## BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0.9	Benefits: £1.5	Net: £0.6	Yes	Zero Net Cost

# Summary: Analysis & Evidence

# Policy Option 4

Description: Government Top Slice

## FULL ECONOMIC ASSESSMENT

Price Base Year 2012	PV Base Year 2012	Time Period Years 30	Net Benefit (Present Value (PV)) (£m)		
					Best Estimate: 15.6m

COSTS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition)	Annual (Constant Price)	Total (Present Value)	Cost
Best Estimate	£1m		£1m		£19.4m	

### Description and scale of key monetised costs by 'main affected groups'

The main costs of option 4 are the initial start-up costs of setting up the agency, valued at £1m PV, and the ongoing operating costs of the agency, valued at £18.4m PV. Ongoing running costs are staffing costs and associated overheads.

### Other key non-monetised costs by 'main affected groups'

n/a

BENEFITS (£m)	Total (Constant Price)	Transition Years	Average (excl. Transition)	Annual (Constant Price)	Total (Present Value)	Benefit
Best Estimate	n/a		£2.6m		£35.0m	

### Description and scale of key monetised benefits by 'main affected groups'

Under option 4, there is a reduction in the costs of managing the CSO as the "contingency buffer" decreases, valued at £18.2m PV. This arises from the aggregate obligation being potentially lower than the sum of the stock, over and above the CSO, held by individual companies. In addition, an agency may be able to make use of a lower cost of capital, with an associated saving in investment costs of £1.4m. Thirdly, storing oil has an associated opportunity cost and by storing less this is reduced, with a value of £13.6m. Under this option Government purchases oil from industry and ownership of the asset changes hands. The opportunity cost faced by Government of storing oil is lower than that of industry and hence there is an additional future benefit stream valued at £1.8m in PV (this is the only monetised benefit that differs between options and relates to the entire CSO).

### Other key non-monetised benefits by 'main affected groups'

An agency may be able to reduce the risk of non-compliance and so increase resilience when faced with global supply disruptions. In addition, this option would offer increased resilience in the event of a closure of a refinery as the agency manages the obligation centrally and would adjust the fee to compensate rather than companies being forced to accommodate the change in their obligation themselves. Moreover government ownership of stock might further reduce non-compliance risk

### Key assumptions/sensitivities/risks

Discount rate (%) 3.5

A key assumption in the analysis is the future split between physical stocks and the ticket market, given the inherent uncertainties. Sensitivity analysis of changing the ratio of tickets to physical product held each year by 10% yields a change in NPV of +/-£6.2m. Refer to paragraph 80 for a full list of sensitivities tested. There is a risk an agency would not have an incentive to minimise costs as these are recovered through a levy on industry. However this risk will be mitigated through the governance structure of the agency.

## BUSINESS ASSESSMENT (Option 4)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0.9	Benefits: £1.6	Net: £0.7	Yes	Zero Net Cost

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## Evidence Base

1. This impact assessment analyses the costs and benefits of potential policies for future management of the UK's compulsory stocking obligation (CSO) for oil stocks.

### Background

#### CSO obligation

2. The UK is required to hold emergency stocks of crude oil and petroleum products to release to the international market to bridge a gap in supply in the event of global short-term oil supply disruptions. This is to comply with international requirements set by the EU and the International Energy Agency (same stocks used to meet both obligations). The EU currently require the UK to hold 67.5 days of annual daily inland consumption. The IEA requirements are based on net imports and currently are a smaller volume given the UK's indigenous production.
3. The UK is required to meet these obligations to mitigate detrimental impacts on the UK, EU and international partners in the event of a supply disruption. If sufficient stocks are not in place, the energy resilience of the UK and other member states may be threatened. Potential impacts include a lack of product available to market and oil prices rising significantly. The UK is also required to provide monthly updates to the IEA and the Commission on the levels of stocks held and would be at risk of infraction should stockholdings fall below required levels in the absence of an authorised stock-draw.
4. The UK's CSO is projected to increase in the future as UKCS production declines and the IEA requirement becomes binding. In addition, as obligated companies must be compliant at all times (i.e. not just for month end reporting), they tend to hold a "contingency buffer" of stocks above what is strictly needed (approx. 4-7%)<sup>1</sup>. This potentially puts UK companies at a competitive disadvantage, as they have to employ greater working capital (over the obligation) and may face higher sunk costs relative to companies in other EU member states which have an (established) agency, with a fixed annual cost for membership.
5. Currently, the UK manages its obligation through placing obligations on individual companies, using powers in the Energy Act 1976 to issue directions setting out individual stocking obligations. These are calculated on a quarterly basis and sent out to the 20 companies<sup>2</sup> subject to the obligation (those who supply above 50,000 tonnes of petroleum products), based on their market share. The market share is calculated retrospectively from data for four quarters, using data for imports plus production (refiners only) minus exports. Companies then provide monthly returns for their stock-holding, which are compared to their calculated obligations to ensure these requirements are being met.
6. Companies largely meet their obligations through stocks held in the UK. Their obligations can also be met through contractual arrangements with other companies based outside the UK, determining that they will hold relevant products for a specified period of time, and make these available to purchase at market price should they be required ("bilateral tickets"). These "tickets" are rights to withdraw oil stocks held under the CSO Reservation Agreement. We currently estimate that approximately 25% of the total obligation is met through contractual agreements with companies in other EU Member States (data from quarter 1 2013). The remaining 75% is made up through physical stocks held in the UK at refineries / in storage sites by companies directly obligated or other UK companies.
7. All bilateral agreements assure unconditional access to the stocks in an emergency and if the IEA requests a stock release as a result of an international crisis then 'ticket' stocks are released at the request of the ticket holder.
8. From January 2013 under the UK Oil Stocking Order 2012 companies are required to meet one third of their obligation in petrol, gas/diesel oil, and aviation fuel. The remaining two thirds of the obligation can be held in crude oil or any product.

<sup>1</sup> Deloitte (2010) "Assessing the current system for meeting the UK's stocking obligations."

<sup>2</sup> with non-zero obligation as of Q3 2013.

**Problem under consideration**

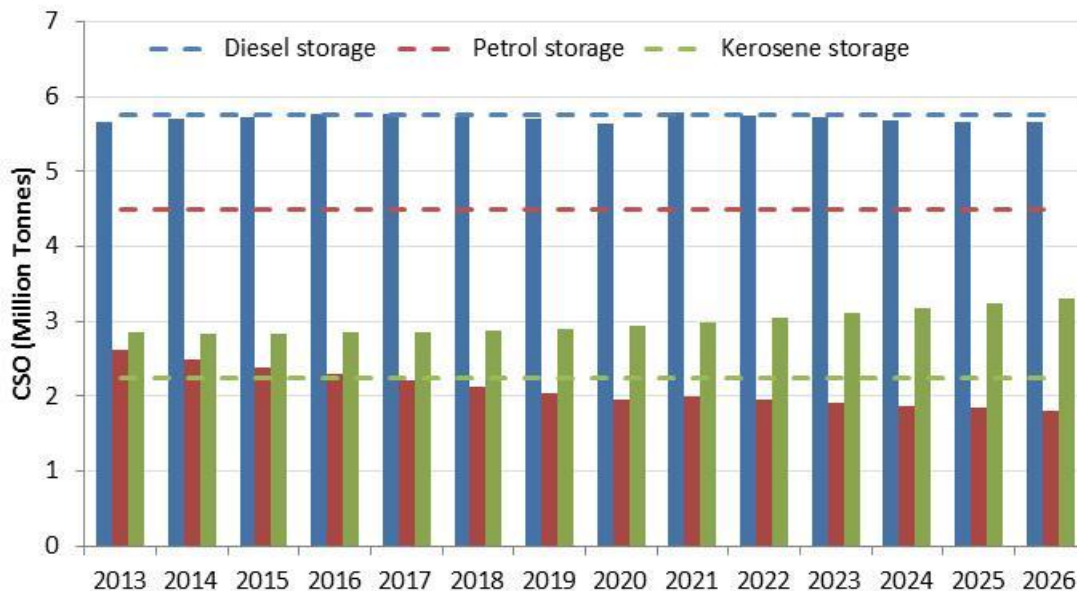
9. Government already intervenes in this market. The market failure and reason for intervention in the first instance is that potentially, left to their own devices, companies would hold less than the socially optimal level of stocks (i.e. the level offering maximum resilience) – hence government (through the International Energy Agency (IEA) and EU) sets an obligation to hold additional stocks to those required for commercial operations, in order to provide a base level of resilience.
10. It is left to the market to decide how and where is best to hold those stocks (either at an obligated company's own facilities or by arranging for another company to hold it on its behalf). Incentives to maximise resilience are clearly only aligned if the most cost effective way of holding stocks for business continuity coincides with storage of stocks that offer the most resilience to UK PLC.
11. Resilience per se is multifaceted and so efficiency of holding stocks and resilience are unlikely to perfectly align if there are various options of how and where stocks can be held. The most resilient way of holding of stocks would likely be to hold levels of finished product integrated and dispersed in different locations within the supply chain that could be called upon in an emergency (i.e. separate from commercial stocks). However, holding strategic stocks dispersed within the supply chain is unlikely to be the most cost effective way of holding as there will be a fixed cost per storage location and many optimal locations for resilience will have a higher associated opportunity cost and possibly higher physical costs of storage relative to further removed locations.
12. International tickets<sup>3</sup> (i.e. tickets held elsewhere in the EU) might be cost effective but are not necessarily the most resilient form of stocks for UK PLC as they are physically stored outside of the UK and therefore potentially far removed from the domestic supply chain. During a domestic<sup>4</sup> stock release these tickets can be called upon to be supplied to the domestic UK market, but time and geographical distance may mean that they instead are directed to simply be 'released to market' (defined as being accessible to final consumers but will not necessarily physically get to the domestic UK market).
13. At present, companies are unable to co-ordinate their approach to oil stocking obligations, as the EU Directive would only allow delegation to a Central Stocking Entity if that was designated by the UK. Therefore companies are unable to explore benefits that may come with a co-ordinated approach.
14. The UK is one of few remaining countries to delegate stock obligations to individual market suppliers rather than a central body. Most other European Member States manage the obligation through a central body, including France, Ireland and Spain. Industry have responded to the consultation and a significant majority of respondents prefer this approach because the costs are more transparent, e.g. the agencies publish their accounts on an ongoing basis, and more consistent, usually constituting a fixed fee. This enables the industry to plan for these costs on a longer term basis rather than managing the cost month by month.
15. There are concerns that the system for managing the CSO in the UK creates investment uncertainty/inertia, leading to underinvestment in adequate storage, and so may harm the ability of the UK to meet the obligation in the medium to long-term. This carries the potential risk of infraction against the UK with associated significant costs, and also undermines the UK's preparedness to manage the impacts of a global short-term supply disruption. The current system instils potential investment uncertainty as industry is unwilling to invest individually to accommodate the CSO whilst there is a possibility that Government may facilitate a Centralised Stocking Entity (CSE).
16. The issue can be summarised by the following three headings:

**Obligation is increasing, and with it the costs of compliance**

17. As our domestic production of crude oil declines, the net imports obligation set by the IEA will override the EU's requirement. Internal DECC forecasts suggest that the IEA's obligation based on overall net imports will set in from 2024 and so therefore will result in an increase in the obligations levied on individual companies. A preliminary breakdown by products shows that the net imports obligation may set in earlier for individual products, particularly kerosene which is the most limited stock in terms of UK production relative to consumption.
18. The chart below illustrates the DECC forecast obligation by product type alongside the current estimated storage by product in the UK.

<sup>3</sup> As per the Oil Stocking Order 2012 "international ticket arrangement" means an arrangement between P and another person under which that person holds P's stock in another member State for a period of no less than 1 month.

<sup>4</sup> During an International stock release they would simply be called to be made accessible to 'the market'.



19. DECC analysis suggests that the increase in CSO could lead to an additional cost of £4.2billion by 2042 (£1.9billion in PV terms).
20. The uncertainty over the increases in the obligation, and the associated costs of this has raised questions from industry over the effectiveness of the current policy approach. In particular, they are concerned that the current framework may not incentivise the necessary investment in storage capacity.

#### **Storage is reaching capacity, particularly for middle distillates**

21. Current data suggests total UK storage is between 12-13 million tonnes of oil equivalent for the main petroleum products consumed in the UK (petrol, diesel/gas oil and kerosene), some of which will be used for CSO. DECC forecasts suggest that additional storage needed for these products could be in the region of 1million tonnes by 2025.
22. New storage build for individual companies is expensive and inherently risky. An agency would have better access to finance and on more favourable terms than individual companies and could fund this through loans from member companies.
23. The nature of the cost of CSO (non-transparent and largely woven into every day operating costs) has given companies little incentive to invest in larger long-term storage assets in response to the approaching increase in the obligation. Given the uncertainties of the UK downstream oil market, most companies are unprepared to allocate large amounts of liquid capital for investment in long-term CSO storage facilities when higher returns are available elsewhere. This could lead to market exit by some market players and an increase in CSO cost per firm, which further compounds the risk of non-compliance in the future.
24. Industry claim that lack of investment in new storage facilities is primarily due to their substantial cost. Given the need for new storage is predominantly linked to a growing CSO obligation and not to commercial activity, there is little commercial added-value in building these facilities on an individual company basis, particularly when the liquid capital necessary for these investments can be allocated elsewhere with higher returns. In other words, the industry currently lacks incentive to build additional long-term storage for CSO.

#### **Ticket market volatile and increasingly tight given EU lack of storage capacity / middle distillate production.**

25. If no storage is built (in the medium term) the industry will, by default, be increasingly reliant on the ticket market for all categories of fuel in line with the increase in the UK's obligation as a whole. The availability of storage sites is more critical when considering this by product type, as not all storage facilities can be easily substituted between products. Under DECC central forecasts the UK obligation currently breaches our estimated storage capacity for jet fuel.



26. The UK is well placed for storing light distillate and heavy distillates but middle distillate<sup>5</sup> storage is in short supply, reflecting that UK refineries were originally designed and configured to primarily refine petrol, and so storage facilities were built to match this production mix. UK demand, in common with many other European countries, is increasing for diesel and aviation fuel whereas our refineries are geared to produce gasoline and fuel oil (originally for electricity generation). The UK will continue to require storage facilities for gasoline and fuel oil before they are exported. In addition, as more diesel and aviation fuel is imported in the future these products will also require separate storage (and an increasing amount over time).
27. This structural imbalance of middle distillate products is also seen at a European level, and North West Europe generally is reliant on non-EU imports to meet demand for diesel and kerosene. Over the longer term, therefore, there is an EU-wide forecasted increase in reliance on the ticket market under the “do nothing” option. The likelihood is that the supply of tickets will reduce as Europe as a whole increases its deficit of middle distillate products. This tightening of the ticket market will lead to an increase in cost on the industry and associated risk of non-compliance, potentially reducing the UK’s ability to mitigate the effects of a short-term supply disruption.
28. In particular, it is likely that tickets for jet fuel will be priced at a premium. The EU as a whole is a net importer of this product, and the UK is the third largest global consumer (with the highest demand in the EU). The new Directive (EU Oil Stocking Directive through the Oil Stocking Order 2012) identifies particular products for the UK to store (based on consumption), and so will increase demand for stocks of these finished products. Jet fuel has not previously been separately obligated which has further contributed to uncertainty over the cost of these tickets. Given our domestic demand for this product the UK has a high level of risk associated with exposure to the ticket market for jet fuel.
29. Ticket trading occurs over-the-counter through brokers and directly through industry parties. Price reporting is complicated by the availability of contracts of different lengths. Price transparency is relatively poor in the market and we do not have a comprehensive dataset on ticket prices.
30. Rapid ticket cost movements are likely to further erode thin margins and risk increasing company non-compliance or (at the more extreme end and in combination with other burdens), market exit. Under the current framework, should companies leave the UK market the policy approach is for remaining obligated companies to meet any national obligation arising from unplanned market exits. Should companies leave the UK market under the “do nothing” approach this could therefore exacerbate the situation for other companies (adding unexpected additional costs) and possibly prompt legal challenge against DECC.
31. In short, increasing reliance on the ticket market is a risk of “do nothing”. Given the uncertainty and likely tightening and volatility of the market there are likely to be resilience benefits from facilitating less exposure to the ticket market (see para 12).

### Rationale for Intervention

32. Government already intervenes in the market by imposing a compulsory oil stocking obligation on the grounds of security of supply and resilience. The rationale for altering the current mechanism of intervention is ultimately to increase resilience by increasing the efficiency of management of the obligation. Reasons the current system may not be providing maximum resilience and therefore could be improved are a combination of the following factors:
33. Low returns: There appears to be a lack of willingness to invest in new storage for CSO as the return on doing so would likely be low given that it would primarily be used as storage for the mandatory obligation. Moreover with higher returns available elsewhere on the capital required for investment there is little incentive (for individual companies) to invest large amounts of liquid capital purely in physical storage and a strong incentive to cover incremental obligations with tickets. The volatility of the ticket market and uncertainty over future prices mean that companies cannot be confident that storage will be more cost effective than tickets (in the short term companies can cover marginal obligations with tickets and ‘wait and see’).
34. High risk: Compounding low returns is the relatively high risk attached to investment in storage in the UK. The low margin nature of the industry and associated risk of market exit creates additional uncertainty over the future making long-term investments inherently more risky.

<sup>5</sup> Middle distillates - a general classification of refined petroleum products that includes distillate fuel oil (including diesel oil) and kerosene. Sourced from [http://www.eia.gov/pub/oil\\_gas/petroleum/data\\_publications/weekly\\_petroleum\\_status\\_report/current/pdf/glossary.pdf](http://www.eia.gov/pub/oil_gas/petroleum/data_publications/weekly_petroleum_status_report/current/pdf/glossary.pdf)

35. Myopia and moral hazard: In the short run companies have an incentive to cover incremental obligations through tickets (bilateral or otherwise). It is this greater exposure to the ticket market in the longer term that increases the risk of future non-compliance and lower resilience and so acts as a moral hazard (where industry do not necessarily have incentives to act in the best interest of UK PLC in the long run).
36. Co-ordination failure: the present system for managing the obligation creates a co-ordination problem for companies to jointly invest in storage. This is exacerbated by an expectation from industry that an agency may or indeed will be set up in the longer term on the basis of the approach taken by other European countries. Combined with the above drawbacks to investment this has led to apparent inertia in industry to act in the absence of a “level playing field” where each individual company believes the onus is on another. And as storage reaches capacity in the UK this poses a long run issue for government. In responding to the consultation, several respondents have also pointed out that several large storage facilities may close in the coming years because there is not an investment case for them for individual companies, but that an agency may be able to invest here if it can be established in good time.
37. Given the forecast increase in obligation (paragraphs 17 and 18) intervention could help coordinate the necessary investment and realise gains from economies of, and returns to, scale. Greater investment certainty will help deliver continued UK compliance and provide greater cost transparency in line with international best practise.

### Policy Objective

38. The policy objective is to ensure that the CSO continues to be met in the future in the UK, as the overall obligation increases in response to declining UKCS production; so that the UK both holds and can deploy sufficient emergency stocks to mitigate the detrimental impacts on the UK, EU and IEA members of any global oil supply disruption. This supports Government’s objectives to improve energy resilience.

### Description of Options

39. We consider the following options in the “cost-benefit analysis” section below:
40. *Option 1: “do nothing”*. The CSO continues to be satisfied by individual directions on obligated companies.
41. *Option 2: Government Strategic Reserve*. Companies remain obligated to meet the current CSO but Government creates a public agency to manage the increase in the overall stocking obligation by purchasing physical stocks and tickets to meet the obligation. The set-up costs and on-going costs of the agency would be funded through a levy payable by each oil company and consumer of oil products (those obligated under the Directive).
42. *Option 3: Private Stockholding Agency*. Companies remain obligated to meet the current CSO but a private stockholding agency would be set up to manage the CSO. The agency would decide how much of the obligation it takes on and over what time scale, with the option of managing 100%. The agency would manage the increase in CSO by purchasing stocks and tickets to meet the obligation. The initial start-up costs and on-going agency costs would be funded by a levy on obligated companies, though the agency would be strictly not for profit to comply with EU guidance. For the purposes of the IA this has been assessed as the agency taking responsibility for at least the incremental obligation going forwards. Many respondents to the consultation suggested that the perceived benefits would be greater if an agency managed 100% of the obligation, so encouraging a swifter transition. This is something to be considered in the policy making process.
43. *Option 4: Government top slice option*. This option is a variation of the private stockholding agency where Government would own a fixed percentage of the stock through the agency, modelled as one third.

### Summary and preferred option

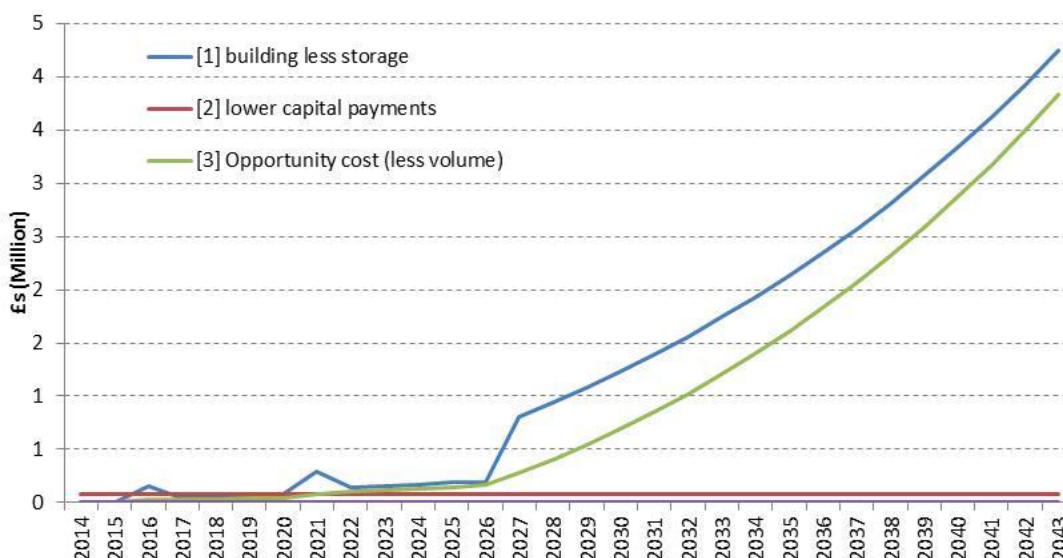
44. Option 3 is the preferred option. This is the preferred option as it presents welfare benefits without a cost to the exchequer. We believe a private stockholding agency will increase investment certainty and better manage the aggregate obligation by exploiting economies of scale and scope. We are currently drafting a response to the consultation, but subject to clearance from Ministers and other Government Departments, we expect to indicate that the UK is minded to introduce primary legislation (when parliamentary time is available) to enable a private stockholding agency to be set

up by industry with compulsory membership for obligated parties and delegation of the incremental increase in obligation of individual companies. This will require work with industry, following a Government Response to the consultation, to develop a detailed roadmap for the establishment and progression of a CSE.

- 45. The main monetised benefits of option 3 are the agency being able to hold less of a contingency buffer in aggregate than each obligated company, and the associated reduction in cost of storage and tickets, valued at £18.2m PV. There is also an associated benefit from the opportunity cost of holding less product (£13.6m). In addition, an agency may be able to make use of a lower cost of capital for borrowing, with a reduction in costs valued at £1.4m PV. This may aid in incentivising investment in new storage. Option 3 also minimises the impact on government balance sheet, whereas Option 2 has a large and negative impact on the exchequer. The main cost of Option 3 is the initial set-up of the agency and continuing running costs at a value of £19.4m in PV terms.
- 46. Option 4 is not preferred. While this option would allow a stricter control over release of a proportion of the stocks, it also represents a cost to the exchequer for the purchase of stocks in addition to the costs detailed above, valued at £17.6m PV. Option 2 is also not preferred. While the other costs and benefits are likely to be similar to those under option 3, costs in the public sector are likely to be higher. And crucially this option also carries an upfront cost to the exchequer of purchasing stock, with an estimated value of £52.8m.
- 47. The large majority of consultation responses from industry indicated that they agreed with the cost benefit analysis set out in the impact assessment. Our assessment has not fundamentally changed in approach though we have updated assumptions and considered evidence from industry.
- 48. Monetised costs and benefits of the preferred option are set out below:

<b>Benefits (£m PV):</b>	
Difference due to holding less 'contingency buffer' (and thus building less storage)	<b>18.2</b>
Difference due to lower cost of capital for building storage so lower annual payments on loans	<b>1.4</b>
Opportunity cost of holding less product	<b>13.6</b>
<b>Costs (£m PV):</b>	
One-off cost of setting up agency	<b>1.0</b>
Ongoing agency costs - staffing, overhead etc.	<b>18.4</b>
<b>NPV</b>	<b>£13.7m</b>

- 49. The profiles of undiscounted benefits for the preferred option are set out below. (Equivalent detail for option 2 and 4 is set out in the annex)



- 50. The profiles illustrate that in 2026 benefits from the policy option become significant as the forecast obligation rises above current levels of storage capacity. They exhibit a non-linear profile as, once

the threshold for storage in the UK is reached and the excess obligation is assumed to be stored in newly built storage, benefits between base and option compound over time. The total obligation is likely to increase over time as we become more import dependant (ref para 4). In the base case a significant volume of storage is needed post 2026 and this has an associated cost. Under the preferred option the lower volume that needs storing compared to the base drives the benefit profile from thereon.

## Modelling and Analysis

51. The following describes the method and modelling framework we have used to conduct the monetisation of costs and benefits.

### Costs

52. Set up costs: these have been sourced from a Deloitte report<sup>6</sup> that assumed that one-off costs to reflect the transition to an agency would be £1m. This does not include the cost of legislation, only direct set up costs of the agency such as hiring staff, determining office location and procedures to create it as a legal entity.

53. Recurring costs: these have been assumed to be £1m each year and cover recurring staffing costs and associated overheads. This covers 10 FTEs and was assessed as comparable to other CSEs that currently operate<sup>7</sup>.

### Benefits

54. Less “contingency buffer” (building less storage): at present individual companies operate an additional buffer stock over and above the obligation to mitigate against risk of non-compliance and short-term variability in demand and supply. We estimate that companies retain 5% of product over and above their individual obligation.<sup>8</sup> On a national scale demand is more stable than individual company product sales and the CSO is therefore likely to be more predictable. The agency would therefore have scope to reduce this contingency buffer over and above the obligation; we have assumed a reduction to 4%, which reduces the cost. The monetisation of this represents the difference in storage costs between the base case and the respective option. This is calculated by multiplying the product volume (from incremental CSO) of the lower “contingency buffer” by the per tonne storage cost and added to the upfront building cost. That is for each year the increase in CSO with a 4% uplift is taken away from the increase in CSO with a 5% uplift. This is the volume of additional product that needs to be stored between base and the option. This is multiplied by the upfront cost of building storage for that volume and is added to the on-going maintenance costs of storing it. We assume that all the incremental CSO that is held as physical product above the ‘contingency buffer’ is stored in newly built storage. This is comprised of the upfront cost of building with the operating cost of the facility.

55. Lower costs of capital: This captures the notion that an agency would have better access to financing options than individual companies as it can gain from risk pooling and therefore gain access to cheaper credit. This is calculated by taking away the difference in interest payments between base and option that would be accrued for building the required storage. We have assumed that new building of storage is financed through debt and that the agency would benefit from a 0.5ppt cheaper credit. The respective costs of debt we have used are 8.5% for individual companies and 8% for the agency.

56. Lower opportunity cost (of holding less product): storage of product presents an opportunity cost in the form of foregone interest (compounded) plus the physical cost of storage. The benefit of storing less product in aggregate is measured as the interest on the difference in value (assessed at wholesale prices) between levels of product being stored. To assess this we have assumed that changes in the crude price as set out in DECC oil fossil fuel price projections<sup>9</sup> are passed through into product price changes. The calculation is the difference between the foregone interest accrued between the option (CSO with 4% uplift) and the base (CSO with 5% uplift). We have assumed a 6.5% real rate of return. Note that we have not assessed the opportunity cost on the cost of storage as this is being funded by debt under all our scenarios.

<sup>6</sup> Deloitte (2010) “Assessing the current system for meeting the UK’s stocking obligations.”

<sup>7</sup> Deloitte (2010) “Assessing the current system for meeting the UK’s stocking obligations.” Annex c

<sup>8</sup> In “Assessing the current system for meeting the UK’s stocking obligations” (2010), Deloitte use an average contingency buffer of 5%, based on evidence from companies that suggested a range of 4-7%.

<sup>9</sup> [http://www.decc.gov.uk/en/content/cms/about/ec\\_social\\_res/analytic\\_projs/ff\\_prices/ff\\_prices.aspx](http://www.decc.gov.uk/en/content/cms/about/ec_social_res/analytic_projs/ff_prices/ff_prices.aspx)

57. Lower opportunity cost (of change in asset ownership): This refers to the opportunity cost of storing product in the future and a benefit stream results from Government ownership of stock as the difference between the foregone interest under Government ownership and foregone interest under industry ownership. Government rate of return is 3.5% whilst industry assumed return is 6.5%. Note that this is the only monetised benefit that differs between options and the opportunity cost applies to the total CSO, not just the 'contingency buffer'.

## Cost benefit analysis

### Establishing a base case: "do nothing"

58. An appraisal period of 30years has been used to best represent the time horizon of impacts of the policy and capture the long term issue of the problem under consideration. Given the nature of the investment decisions and physical building of storage a shorter appraisal window would be misrepresentative and not capture longer term potential impacts. As is illustrated by the profiles of benefits above (and in the annex) an appraisal period of 20years or 40years would not materially change the conclusions of the impact assessment as impacts are significant after 10 years. (See annex for EANCB across appraisal years).
59. As is consistent with the approach set out in the Green Book, this impact assessment assesses costs and benefits that signify a change in total welfare. Therefore wealth transfers are not captured under costs or benefits but the implications are discussed under the wider impacts section. For consistency transfers have not been included in the Business Assessments.
60. At present, individual companies tend to operate an additional buffer stock over and above the obligation to mitigate against their individual risk of non-compliance and short-term variability in demand and supply. In establishing a base case, we have therefore assumed individual companies maintain a contingency buffer of 5%<sup>10</sup>. Using DECC forecasts of future CSO levels, with a 5% uplift for assumed 'contingency buffer', and taking into consideration current surplus stocks that could be used to meet future increases in the obligation, we have projected a rise in the CSO to approximately 24 million tonnes by 2042.
61. At present up to 29% of the UK's total obligation is met through tickets held with other companies in the UK ("domestic tickets"), and 25% of the total obligation is met through tickets held with companies in other EU Member States ("bilateral tickets"). The remaining 46% is made up through physical stocks held in the UK at refineries/in storage sites by companies directly obligated. In the analysis we use the physical/ticket average ratio over the last 5 years and keep this constant going forwards. Furthermore, we assume all new physical stock is met through the building of new storage, with an associated building cost of £242/tonne and operating costs of £31/tonne/year<sup>11</sup>.
62. To fund investment, we have modelled companies borrowing funds at an assumed cost of capital of 8.5% (real) and 100% debt financing.

### Option 3: Private Stockholding Agency [preferred option]

#### Benefits

63. An agency is likely to maintain a lower 'contingency buffer' than under the "do nothing" scenario. The agency would deal with the obligation on an aggregate basis and so changes in obligations between companies would be netted off at this aggregate level. Thus the 'contingency buffer' that the agency would need to maintain on a day to day basis is likely to be smaller than the sum of individual company 'contingency buffers' as demand is more stable on a national scale hence the CSO is likely to be more predictable. We assume this reduces the buffer margin to 4%. Using the assumptions outlined in "Key Assumptions" section below, this results in a saving of £18.2m PV relative to the base case.
64. Under this option agency costs would be charged through a levy placed on the companies using the agency, likely through an average cost payable by each company. As this levy is likely to be a more secure future cash flow, this implies a lower level of risk for lending to an agency, reducing the cost of capital. Deloitte<sup>12</sup> estimate more secure cash flows as a result of a levy on costs could lead to a

<sup>10</sup> In "Assessing the current system for meeting the UK's stocking obligations" (2010), Deloitte use an average contingency buffer of 5%, based on evidence from companies that suggested a range of 4-7%.

<sup>11</sup> Deloitte (2010) "Assessing the current system for meeting the UK's stocking obligations," based on a tank size of 30,000m<sup>3</sup>.

<sup>12</sup> Deloitte (2010) "Assessing the current system for meeting the UK's stocking obligations."

reduction in the cost of capital of 0.5ppts, compared to that of a private sector company. Using this assumption in our modelling results in savings of £1.4m in PV terms.

65. In addition, under option 3 there is a benefit from the opportunity cost of storing the oil under the base case. In general the opportunity cost of storing product is the foregone interest on the value of the product plus the costs of storing it. At an aggregate level a lower 'contingency buffer' is equivalent to storing less product and thus there is a benefit equal to the lower opportunity cost of storing less. This has been assessed to be the foregone interest and is valued at £13.6m in PV terms.

#### Costs

66. Under option 3, there is an initial cost of setting up the agency, valued at £1m. There are also on-going costs of the agency, including staffing costs and associated overheads. Deloitte<sup>13</sup> estimated these at £1m per year resulting in £18.4m in PV terms.

#### Non monetised costs and benefits

#### Costs

67. Monitoring and compliance costs are likely to be marginally higher under this option, to include monitoring the agency as well as the individual companies. Monitoring and compliance costs are those that arise from having to monitor compliance by the agency in addition to the companies that are under obligation. The marginal cost to government of doing this, given current costs of monitoring companies are incurred, is likely to be minimal and so have not been quantified.

#### Benefits

68. Resilience: this option may offer increased resilience by decreasing the risk of non-compliance nationally<sup>14</sup>, as an agency could meet a shortfall from one company with additional stocks from another company it deals with.
69. In addition, this option would offer increased resilience in the event of a closure of a refinery. Under the current framework, should companies leave the UK market the current approach is for remaining obligated companies to meet any national obligation arising from unplanned market exits. Individual companies would do this by changing the amount of working capital stock in use. An agency could better plan for a market exit and re-distribute increased obligations across companies simply by adjusting the levy paid by obligated companies.
70. Even playing field: obligated companies that have access to bond markets have different credit ratings and so pay different prices to borrow money at present. Under an agency the differing cost of borrowing money between companies will not be relevant in the context of the CSO and therefore those with high borrowing costs stand to gain. Note that the aggregate reduction in borrowing cost has been monetised though the benefit of the cost of managing the CSO being even between companies has not been monetised.
71. Returns to/economies of scale: the ability to collectively manage the obligation is likely to lead to more efficient management of the total national obligation through returns and economies to scale of operations. There is potential for these to be greater the larger the proportion of the obligation that is managed by the CSE is.
72. Use of salt caverns: evidence from industry suggests that use of salt caverns as storage are significantly lower than building new storage. A recent (2011) company report received by UKPIA estimates salt cavern refurbishment costs, for an 800 000m<sup>3</sup> area, at about £2.5m, contrasting with costs of £25m to build a new 80,000m<sup>3</sup> steel tank. In practical terms the scale and location of salt cavern storage makes it difficult for individual companies to use commercially, although it could be viable for part of an agency's asset storage mix and thus may provide significant cost savings. This has not been monetised due to uncertainty over viability of use, though if they were able to be used this would increase the estimated benefits. In response to the consultation some respondents have pointed out that a clear early steer from Government and the establishment of a CSE could help investment in this storage. This provides evidence for the aforementioned potential economies/returns to scale that an agency could benefit from (see para 33).
73. Industry are extremely supportive of this option and have invested in consultancy reports and resource to take this concept forward, which demonstrates the benefits they perceive that would

<sup>13</sup> Deloitte (2010) "Assessing the current system for meeting the UK's stocking obligations."

<sup>14</sup> in the case of a global supply disruption national obligation could be met through pooling of stocks

result from this approach. Although not monetised this is a signal that there are clear benefits of such a scheme to industry. This view was reiterated at consultation as the large majority of industry respondents made clear that they remain very keen to see progress in this area, to as fast a timetable as is reasonable and prudent given governance considerations and details of the CSE are thought through. In general they have also made clear though that for these benefits to be reached; a CSE would need to have mandatory membership.

74. Anecdotal evidence from consultation responses suggest that there might be significant admin savings from implementing the CSE. If these savings were realised they could result in £0.5m-1m of additional benefits per year. These however have not been included in the main cost benefit analysis as it is not clear the extent to which these savings would apply across all companies and over what time frame.

**Option 2: Government Strategic Reserve**

75. While the set-up and ongoing operating costs of the agency under option 2 are likely to be the same as those under option 3, costs in the public sector may be higher. This option also carries an upfront cost to the exchequer, valued at £52.8m PV, and may present issues for government balance sheet.
76. The benefits of option 2 are likely to be the similar to those under option 3. In addition, under this option, as ownership of the asset changes between private companies and government, there is an additional benefit stream resulting from the lower opportunity cost government faces of storing oil, valued at £5.5m in PV.
77. There is also a potential increase in resilience to cope with short-term supply disruption as Government has direct control over supply of some stock. The benefits of increased resilience have not been quantified, but are an important rationale for intervention.

**Option 4: Government top slice**

78. Under option 4, the start-up and ongoing agency costs are likely to be the same as under option 3. However, under option 4 there is also a cost to the exchequer for the purchase of stocks, valued at £17.6m. This option also carries an upfront cost to the exchequer, valued at £17.6m PV, and may present issues for government balance sheet.
79. The benefits under option 4 are likely to be similar to those as under option 3. In addition, under this option Government purchases oil from industry and, as ownership of the asset changes, there is an additional benefit stream resulting from the lower opportunity cost government faces of storing oil, valued at £1.8m PV. Option 4 would also allow stricter control over release of a proportion of the stock as Government has direct control over supply of some stock. The benefits of increased resilience have not been quantified, but are an important rationale for intervention.

Key Sensitivities tested

- Forecast ticket price (by product)
  - ‘Contingency buffer’
  - Changes to product forecasts
  - Changes to ticket/physical split
  - Differences in assumed financing costs
  - Costs of storage
80. The table below illustrates the impact of the sensitivities of option 3 tested relative to the base case. In each instance the sensitivity has been tested in isolation with other variables set to base case. The sensitivity analysis undertaken illustrates that results are robust to varying assumptions (the appropriateness of which were tested in consultation). As above, in general respondents were supportive of the assumptions made in the IA, and no specific concerns were raised about the sensitivity analysis.

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Sensitivity	Change to NPV (£m)	
	Low	High
Ticket price +200%/+500% each year	+5.6	+11.2
Difference in assumed contingency buffer +/-0.5ppt	-16.6	+16.6
CSO forecasts +10%/- 10%	-2.8	+3.3
Proportion of tickets held +/- 10%	-6.2	+6.2
Difference in cost of capital +0.5%/- 0.25%	-0.7	+1.4
Costs of storage small tank/medium tank	+118.2	+427.5

81. Clearly the reduction in product stored between the two scenarios drives the benefit of the 'contingency buffer' and this is an assumption that was approved by industry in consultation. Most sensitivities result in a reasonable range.
82. However, assuming different storage costs between the base case and the option assessed presents sensitivities of a high order of magnitude. Given the sensitivity of this assumption we have assumed that under the base case and the option large tank storage is invested in. This is consistent with the view reached in Deloitte's analysis. The magnitude of the sensitivity illustrates the potential economies of scale from storage building.

**Changes from consultation stage**

83. Since the consultation stage IA we have updated assumptions and incorporated evidence provided from consultation into our analysis. This resulted in differences since the consultation stage IA though our conclusions have not changed. The table below illustrates where the main changes have been made and how the final NPV was affected. The NPVs relate to the preferred option.

Change to NPV (£m)	
Ticket cost calculation	+2.6
CSO forecast update	-6.1
Oil price projection update	-5.6
Product value & CSO uplift	-4.3
Misc.	+2.6
Sum	-10.8

- Ticket cost calculation: this modifies the way in which the ticket cost was applied.
- CSO forecast: this updated the CSO forecast using more recent data and underlying DECC production and demand projections.
- Oil price projection: this updates the underlying crude oil price in the analysis and the profile going forwards to be consistent with new DECC fossil fuel price projections.



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- Product value & CSO uplift: this updates the calculation of product value used to derive opportunity cost benefits by removing tax and duty from the analysis. And modifies the uplift to CSO post 2030 split by individual product.
- Misc.: this includes updating ticket prices over time and calculation/formula modifications.

### Wider impacts

84. Devolution - no devolution issues as emergency oil stocks are a reserved matter and the oil stocking obligation will continue to cover the UK. Energy generally is devolved in Northern Ireland but oil stocking is not.
85. Threat of exit: the threat of market exit has been raised as a disadvantage of the current system, given a lack of transparency in the costs incurred in meeting the CSO. Option 3 would increase transparency and therefore reduce the threat of market exit.
86. Funding constraints: both option 2 and option 4 transfer assets from industry to government, with an associated cost to Government of £52.8m PV under option 2 and £17.6m PV under option 4. This presents affordability issues as it will impact on government balance sheet. As this impact assessment only considers changes to total welfare this transfer of asset from industry to government has not been captured in the business assessment.

### Direct costs to business

87. The section above (“Cost-benefit analysis”) discusses cost and benefits to society at large, including business. For the purposes of one-in, two-out (OITO), we believe the direct costs on business of option 3 are the initial costs of setting up the agency and ongoing operating costs, with a total value of £19.4m PV, which are funded by industry via a levy from the agency. The direct benefits to business are the reduction in storage costs as a result of reduced contingency buffers, reduction in costs as a result of a lower cost of capital, and the associated reduced opportunity cost, with a total value of £33.1m PV. This gives a positive NPV of £13.7m for business,
88. We are proposing a change to the existing intervention framework that implies a net benefit to business. Without the proposed amendment companies would not be able to use a CSE to hold obligated stocks and thus realise the aforementioned benefits. So we believe the policy to be a regulatory in but a zero net cost measure.

### Small and micro business assessment

89. This policy measure does not affect small and micro businesses as smaller suppliers are not subject to the obligation in the first instance. As stated in paragraph 5, only firms that supply more than 50,000 tonnes of oil product into the UK are subject to the obligation. These firms will have more than 50 FTEs and therefore any measure that affects the CSO does not impact on small/micro business.<sup>15</sup>

## Risks and assumptions

### Key assumptions

#### Level of CSO

90. CSO requirements in the future, split by product, use DECC forecasts to 2026 and thereafter increase at constant rate for each product. In line with potential demand/supply balances petrol remains flat, whilst diesel and kerosene both increase at 6% pa. CSO projections are inherently subject to significant levels of uncertainty as they depend on future UKCS production, refining capacity and demand projections. DECC projections<sup>16</sup> are used for UKCS production 2013-17 and assumed to decrease at 8% pa thereafter. Demand is projected to be consistent with DECC’s energy and emission projections<sup>17</sup> and is split by product. Both the IEA and EU obligation are then calculated as appropriate for each respective obligation.
91. Stock obligations are split by product; diesel, petrol and kerosene.
92. At present individual companies operate an additional buffer stock over and above the obligation to mitigate against risk of non-compliance and short-term variability in demand and supply. In

<sup>15</sup> DECC holds the list of obligated companies. The majority are multinationals and have well over 50FTEs. Even those companies at the low end of the obligation spectrum do not classify as small/micro businesses.

<sup>16</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/136390/production\\_projections.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/136390/production_projections.pdf)

<sup>17</sup> <https://www.gov.uk/government/publications/2012-energy-and-emissions-projections>

establishing a base case, we have estimated individual companies maintain a contingency buffer of 5%, using Deloitte estimates<sup>18</sup>. Under option 3 this margin is assumed to decline to 4% because on a national scale demand is more stable than individual company product sales, the CSO is likely to be more predictable and the agency would therefore have scope to reduce this contingency buffer over and above the obligation.

93. All surplus physical product (not tickets) above current storage is assumed to be stored in newly built storage. Incremental tickets are therefore assumed to be held bilaterally.
94. To assess the opportunity cost we have assumed a 6.5% real rate of return. Based on a sample of large oil companies the average cost of equity sourced from Bloomberg was 10.7% (real) which we have adjusted down to allow for large company sample bias.

### **Storage**

95. There are potential economies of scale of storage of building larger storage tanks compared to smaller tanks. In the base case, the incremental increase in stocking obligation is estimated at 13.4 million tonnes by 2042, or around 0.6 million tonnes per obligated company. We have assumed companies will construct the larger tanks (under base and option scenarios), with a size of 30000m<sup>3</sup>, to maximise the potential economies of scale. Note that under all options the modelling has assumed that industry build storage and therefore costs of financing between options do not change.
96. Costs of storage are comprised of upfront building costs of £242/tonne, and on-going operating costs of £31/tonne/year, based on Deloitte estimates.<sup>19</sup>
97. We have assumed that building storage is 100% debt financed.

### **Ticket/Physical product split**

98. The ratio of CSO being met by tickets and that being met by physical stock is based on average data for 2007-2012. We have assumed the ratio is constant under all options. However it is possible that the future market may develop differently. For instance, under option 3 the agency may be more likely to meet future obligation increases using physical stock given the uncertainty and likely tightening of the ticket market. This also has resilience benefit arguments.

### **Ticket prices**

99. The price and availability of tickets in the future cannot be easily estimated. The current price case is based on Q4 2011 companies and brokers information provided confidentially to DECC.

### **Product prices**

100. Product prices are 2013 average wholesale prices and future years are estimated using DECC oil price projections to 2030, and then flat-lined thereafter.

### **Costs**

101. We have assumed the costs of meeting the existing obligation are the same in all models, with the main differences in costs between policy options driven by the costs associated with meeting future incremental CSO requirements.
102. Levy is charged to companies by the agency to cover the costs and set up of the agency.
103. Investment costs are 0.5% less for agency than individual company.

### **Incremental tickets**

104. All incremental tickets are assumed to be bilateral tickets. i.e. the stock is not held in the UK.

### **Risks**

105. There is a risk an agency would not have an incentive to minimise costs as these are recovered through a levy on industry and that they might be passed on to end consumers resulting in a transfer from consumers to industry. However this risk could be mitigated through a governance structure that aligns industry's and the agency's/Government's incentives. Several industry responses to the consultation indicated that it will be very important to establish clear governance of any CSE to ensure it meets the obligation efficiently, and its costs remain transparent, but while maintaining its independence. Some responses expressed a concern that a CSE could potentially act in a non-competitive manner without clear governance, with higher costs being passed on to consumers, and

<sup>18</sup> In "Assessing the current system for meeting the UK's stocking obligations" (2010), Deloitte use an average contingency buffer of 5%, based on evidence from companies that suggested a range of 4-7%.

<sup>19</sup> Deloitte (2010) "Assessing the current system for meeting the UK's stocking obligations."

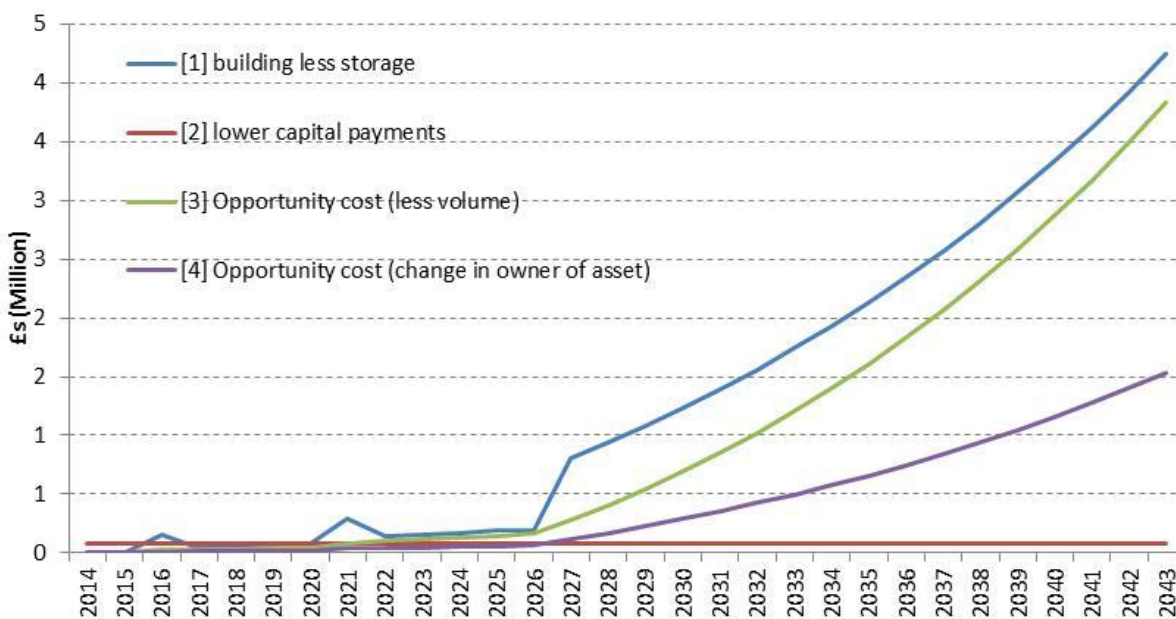
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indicated that all relevant industry players should be involved in the development of the CSE and its governance.

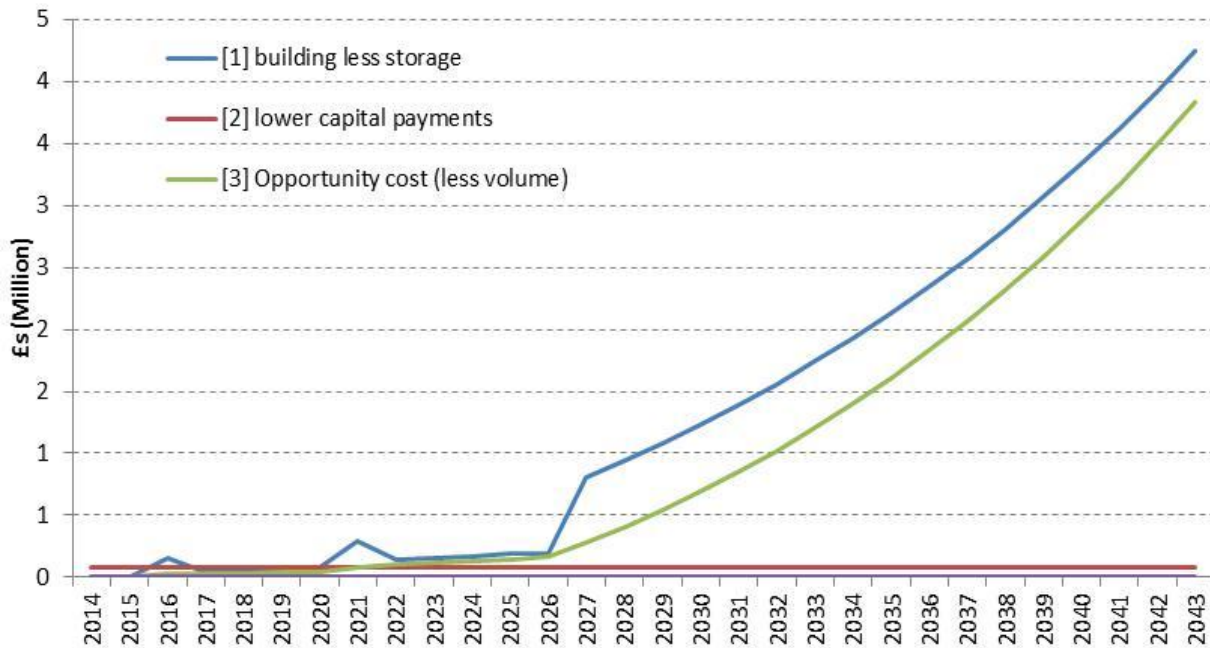
106. In particular there was a concern raised that increasing CSO costs could potentially adversely impact on UK aviation competitiveness, where previous changes to regulatory costs in other areas have had significant impacts. The mechanism to monitor CSO costs is something that will need to be addressed comprehensively in preparing the roadmap for a CSE.
107. There is a risk that the agency cannot exploit economies of scope and reduce the 'contingency buffer' significantly. This is something that we sought views on in consultation and industry felt this was something that could be achieved by a CSE. Moreover although this impacts the potential monetised benefits the non- monetised benefits from central coordination of the obligation remain, mitigating the severity of this risk.
108. The cost profile is also uncertain and there is risk that some costs could be front loaded in the sense that admin and processing costs are higher under a CSE during the initial set up phase but industry responses to consultation felt this would be well mitigated against by the long term benefits associated with a CSE.
109. There is also a potential risk that the agency could simply retain the obligation in tickets and mitigate the said resilience benefits from lower exposure to the ticket market. In the consultation HMG sought wider views from industry on possible changes to CSO policy, including the location of stocks. Government will consider the evidence here and will consider whether this is something that government could look to address through governance of the agency. In addition this is in part mitigated by the price signal that a tightening ticket market would display as it would present a more costly option than storing in physical product.

NPV table and profile of benefits (undiscounted) for each option:

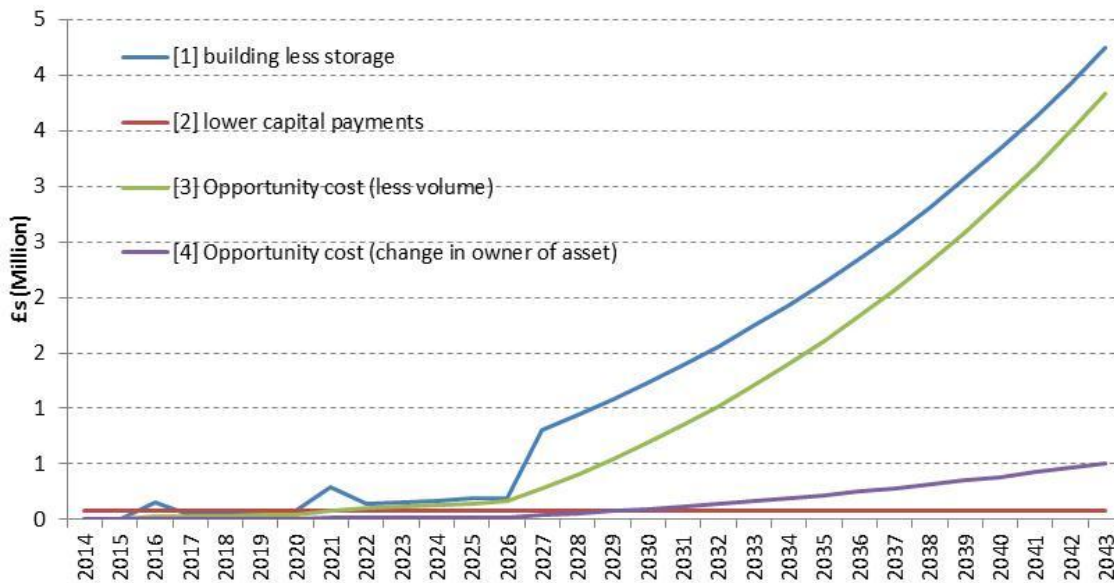
<b>Option: Govt Strategic Reserve (2)</b>		
<b>Benefits:</b>	PV	Average (cons p)
Difference due to holding less 'contingency buffer' (and thus building less storage)	<b>18.2</b>	1.34
Difference due to lower cost of capital so lower annual payments on loans	<b>1.4</b>	0.08
Opportunity cost of holding less product (from contingency buffer)	<b>13.6</b>	1.04
Lower opportunity cost of storage (owner of asset)	<b>5.5</b>	0.2
sum:	38.7	2.88
<b>Costs:</b>		
One-off cost of setting up agency	<b>1.0</b>	
Ongoing agency costs - staffing, overhead etc.	<b>18.4</b>	1.00
sum:	19.4	1.0
<b>NPV</b>		
	<b>19.3</b>	



<b>Option: Private Agency (3)</b>		
<b>Benefits:</b>	PV	Average (cons p)
Difference due to holding less 'contingency buffer' (and thus building less storage)	<b>18.2</b>	1.34
Difference due to lower cost of capital so lower annual payments on loans	<b>1.4</b>	0.08
Opportunity cost of holding less product (from contingency buffer)	<b>13.6</b>	1.04
Lower opportunity cost of storage (owner of asset)	<b>0.0</b>	0.00
sum:	33.1	2.45
<b>Costs:</b>		
One-off cost of setting up agency	<b>1.0</b>	
Ongoing agency costs - staffing, overhead etc.	<b>18.4</b>	1.00
sum:	19.4	1.0
<b>NPV</b>	<b>13.7</b>	



<b>Option: Top Slice (4)</b>		
<b>Benefits:</b>	PV	Average (cons p)
Difference due to holding less 'contingency buffer' (and thus building less storage)	<b>18.2</b>	1.34
Difference due to lower cost of capital so lower annual payments on loans	<b>1.4</b>	0.08
Opportunity cost of holding less product (from contingency buffer)	<b>13.6</b>	1.04
Lower opportunity cost of storage (owner of asset)	<b>1.8</b>	0.14
sum:	35.0	2.6
<b>Costs:</b>		
One-off cost of setting up agency	<b>1.0</b>	
Ongoing agency costs - staffing, overhead etc.	<b>18.4</b>	1.00
sum:	19.4	1.0
<b>NPV</b>	<b>15.6</b>	



Profile of CBA

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043		
<b>Option2: Strategic Reserve</b>																																		
<b>Benefits:</b>	PV																																	
Difference due to holding less 'contingency buffer' (and thus building less storage)	18.2		0.00	0.00	0.16	0.04	0.05	0.06	0.08	0.29	0.14	0.16	0.17	0.19	0.19	0.81	0.94	1.08	1.23	1.39	1.56	1.74	1.93	2.13	2.35	2.57	2.81	3.07	3.34	3.62	3.93	4.25		
Difference due to lower cost of capital so lower annual payments on loans	1.4		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		
Opportunity cost of holding less prod	13.6		0.00	0.00	0.02	0.03	0.03	0.04	0.05	0.09	0.10	0.11	0.13	0.15	0.16	0.28	0.40	0.54	0.69	0.85	1.02	1.21	1.40	1.61	1.83	2.07	2.32	2.58	2.87	3.17	3.49	3.83		
Lower opportunity cost of storage (owner of asset)	5.5		0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.04	0.04	0.05	0.05	0.06	0.07	0.12	0.17	0.23	0.29	0.35	0.42	0.50	0.58	0.66	0.75	0.84	0.94	1.05	1.16	1.28	1.40	1.53		
<b>Costs:</b>																																		
One-off cost of setting up agency	1.0	1																																
Ongoing agency costs - staffing, overhead etc.	18.4		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
<b>NPV</b>	<b>19.3</b>																																	

		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043		
<b>Option3: Agency</b>																																	
<b>Benefits:</b>	PV																																
Difference due to holding less 'contingency buffer' (and thus building less storage)	18.2	0.00	0.00	0.16	0.04	0.05	0.06	0.08	0.29	0.14	0.16	0.17	0.19	0.19	0.81	0.94	1.08	1.23	1.39	1.56	1.74	1.93	2.13	2.35	2.57	2.81	3.07	3.34	3.62	3.93	4.25		
Difference due to lower cost of capital so lower annual payments on loans	1.4	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		
Opportunity cost of holding less prod	13.6	0.00	0.00	0.02	0.03	0.03	0.04	0.05	0.09	0.10	0.11	0.13	0.15	0.16	0.28	0.40	0.54	0.69	0.85	1.02	1.21	1.40	1.61	1.83	2.07	2.32	2.58	2.87	3.17	3.49	3.83		
Lower opportunity cost of storage (owner of asset)	1.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
<b>Costs:</b>																																	
One-off cost of setting up agency	1.0																																
Ongoing agency costs - staffing, overhead etc.	18.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
<b>NPV</b>	<b>13.7</b>																																

# RESTRICTED

		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	
<b>Option4: Top Slice</b>																																
<b>Benefits:</b>	PV																															
Difference due to holding less 'contingency buffer' (and thus building less storage)	<b>18.2</b>	0.00	0.00	0.16	0.04	0.05	0.06	0.08	0.29	0.14	0.16	0.17	0.19	0.19	0.81	0.94	1.08	1.23	1.39	1.56	1.74	1.93	2.13	2.35	2.57	2.81	3.07	3.34	3.62	3.93	4.25	
Difference due to lower cost of capital so lower annual payments on loans	<b>1.4</b>	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	
Opportunity cost of holding less prod	<b>13.6</b>	0.00	0.00	0.02	0.03	0.03	0.04	0.05	0.09	0.10	0.11	0.13	0.15	0.16	0.28	0.40	0.54	0.69	0.85	1.02	1.21	1.40	1.61	1.83	2.07	2.32	2.58	2.87	3.17	3.49	3.83	
Lower opportunity cost of storage (owner of asset)	<b>1.8</b>	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.04	0.06	0.08	0.10	0.12	0.14	0.17	0.19	0.22	0.25	0.28	0.31	0.35	0.39	0.43	0.47	0.51	
<b>Costs:</b>																																
One-off cost of setting up agency	<b>1.0</b>																															
Ongoing agency costs - staffing, overhead etc.	<b>18.4</b>	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
<b>NPV</b>	<b>15.6</b>																															



**EANCB calculations**

EANCB for preferred option (30yr appraisal)

<b>Net cost to business per year</b> (EANCB on 2009 prices)	-0.61
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EANCB for preferred option (20yr appraisal)

<b>Net cost to business per year</b> (EANCB on 2009 prices)	0.27
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EANCB for preferred option (10yr appraisal)

<b>Net cost to business per year</b> (EANCB on 2009 prices)	0.63
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