Title: Impact Assessment of measures to address potential conflicts of interest arising in relation to the choice of National Grid as the delivery body for EMR	Impact Assessment (IA)
IA No: DECC0135	**Date:** 10/10/2013
Lead department or agency: DECC	**Stage:** Consultation
	Source of intervention: Domestic
Other departments or agencies:	**Type of measure:** Secondary legislation
	Contact for enquiries: Jon Doyle

Summary: Intervention and Options

RPC: Out of scope

Cost of Preferred (or more likely) Option				
Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANCB in 2009 prices)	**In scope of One-In, One-Out?**	**Measure qualifies as**
£154m	£m-	-	No	N/A

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

The Great Britain electricity System Operator (SO), within National Grid, has been selected as the delivery body for Electricity Market Reform (EMR), due to strong synergies with its existing role in the energy sector. However, there are potential conflicts of interest between this new role and National Grid's existing roles that could lead to market failure. This could occur via an asymmetry of information that exists between Government and National Grid (through its role as the EMR delivery body). The exploitation of these information asymmetries could lead to sub-optimal delivery of EMR and an inefficient allocation of resources, resulting in welfare losses to society. The perception of conflicts of interest could also reduce investor confidence in EMR and put at risk the investment required to meet EMR's objectives.

What are the policy objectives and the intended effects?

The policy objective is to minimise the risk of conflicts of interest arising, while retaining key synergies between National Grid's new EMR role and its existing SO role. The intended effects of the policy are to:

- Ensure that National Grid deliver EMR effectively and efficiently, and
- Increase stakeholder confidence in EMR delivery arrangements to ensure sufficient investment in electricity infrastructure.

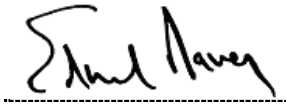
What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

We have considered 5 options for business separation within National Grid, which vary in size and strength of the separation. Each of the options is assessed in terms of the compliance costs of separation (which will ultimately be borne by consumers) and loss of synergies on the one hand, balanced against the benefits from avoided resource costs associated with conflicts of interest:

1. **Do nothing**: Relies on design of EMR delivery role and the existing regulatory framework to limit the ability of National Grid to act on conflicts of interest; protects all synergies between EMR delivery role and existing National Grid roles
2. **Separation of National Grid Electricity Transmission (NGET):** Extends existing ring-fence around combined Transmission Owner (TO) and System Operator (SO) to include EMR functions (and therefore integrated into the SO, to retain all expected synergies)
3. **Separation of SO:** The SO (including EMR functions) separated from the TO business and the rest of National Grid. Retains all synergies, but costs associated with separation likely to be high and existing synergies between SO and TO would be lost
4. **Separation of EMR functions:** EMR functions separated from combined SO/TO business, resulting in loss of synergies and entailing higher costs but fully addressing all potential conflicts
5. **Targeted EMR separation (Preferred Option):** Integrating within SO those EMR functions which deliver most important synergies, while separating remaining functions to reduce risk of conflicts materialising. This represents hybrid of previous options and is preferred, as it balances most effectively the risk of conflicts and the costs of compliance, while retaining key synergies.

Will the policy be reviewed? It will be reviewed. **If applicable, set review date:** 08 / 2019					
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.	**Micro No**	**< 20 No**	**Small No**	**Medium No**	**Large No**
What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)			**Traded:**	**Non-traded:**	

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: 10 October 2013

Summary: Analysis & Evidence: Policy Option 1

Description: Do nothing (baseline) - relies on design of EMR delivery role and existing regulatory framework to limit ability of National Grid to act on conflicts of interest

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2014	Time Period Years 17	Net Benefit (Present Value (PV)) (£m)		
			Low: -1,140	High: 0	Best Estimate: -173

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		90	**1,140**
Best Estimate	N/A		14	**173**

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

This option requires no action by National Grid (NG) and therefore entails zero compliance costs. Under this option, the design of EMR mitigates both the ability and scope for NG to act on any conflicts. Analysis by KPMG on the ability for NG to act, the possibility of detection and the consequences of being found to have exploited a conflict suggest that the risk of any conflict occurring is low. The probability they ascribe to this outcome is between 0% and 33%, with a recommended best estimate of 5%, based on approaches used for 'Value at Risk' assessments favoured in financial analysis. Applying KPMG's probabilities to the resource costs[1] to society from each conflict and examining the total maximum cumulative cost of conflicts (where conflicts occur together) it is estimated that the resource costs – in Present Value terms for 2014-2030 – could range between **£0 and £1,140m**, with a best estimate of **£173m**.

Whilst baseline costs are typically zero, they are here for presentational purposes to show the costs that arise in the business-as-usual case. All policy options are assessed against a zero-cost baseline assumption to express the benefits that society receives from the proposed mitigations.

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

Industry and investors would both likely have less confidence in EMR under this option. Stakeholders have significant concerns that National Grid would use information gained through undertaking EMR delivery functions. This could be within its other businesses or in delivering the existing SO role, to achieve a commercial advantage, either in negotiation with customers or to assist its non-regulated businesses to compete more effectively. While data confidentiality is not a conflict per se, these concerns could lead industry to withhold or submit inferior evidence to the EMR Delivery Plan process. This could cause Government to set Contracts for Difference (CfD) strike prices too high (resulting in increased costs to consumers) or too low (reducing investment in electricity generation infrastructure). Poor evidence may also lead Government to procure either too much or too little capacity, which would either increase costs for consumers or increase the risk of blackouts.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	N/A	**N/A**
High	N/A		N/A	**N/A**
Best Estimate	N/A		N/A	**0**

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

[1] These represent the net effect from changes to capital expenditure on generating assets, generation and carbon costs and capital expenditure on network assets, relative to a base case scenario.

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

All of the synergies between the System Operator (SO) and EMR delivery roles are retained. These allow EMR to be delivered at a lower cost, improve the quality of the analysis used to support Ministerial decisions (subject to receiving reliable data from industry (see above)), and capitalise on the SO's experience administering processes similar to those required for EMR. These synergies could help the SO deliver its existing role more efficiently, reducing costs to consumers. We have used a multi-criteria analysis to help quantify these synergies, on a scale of 1 (minimum retention) to 5 (maximum retention) – for this option, the score is 5.

Key assumptions/sensitivities/risks	**Discount rate (%)**	3.5

In carrying out the CBA we have assumed that:

- The design of EMR, notably transparency/scrutiny arrangements and limits on discretion, successfully reduces the likelihood of conflicts occurring (under the zero-cost scenario)
- Stakeholders place greater weight on the potential risks associated with EMR participation, which reduces the likelihood of engagement in the process
- Acting on a conflict would amount to a breach of National Grid's licence and lead to significant financial penalties.
- Acting on one conflict does not automatically lead National Grid to act on all conflicts
- Benefits and costs are assessed up to 2030 (i.e. over 17 years), consistent with other analysis on EMR[2]

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			**In scope of OIOO?**	**Measure qualifies as**
Costs:	**Benefits:**	**Net:**	No	N/A

[2] https://www.gov.uk/government/publications/energy-bill-impact-assessments

Summary: Analysis & Evidence: Policy Option 2

Separation of NGET: Business separation of NGET (the combined Transmission Owner, System Operator and EMR functions) from the rest of National Grid's businesses.

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2014	Time Period Years 17	Net Benefit (Present Value (PV)) (£m)		
			Low: 0	High: 969	Best Estimate: 147

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		0	**0**
Best Estimate	N/A		0	**0**

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

National Grid already treats its competitive businesses separately from the combined SO/TO functions. It is assumed that adding the EMR roles to the SO therefore entails no additional costs and mitigates the risk that National Grid uses EMR information to favour its non-regulated businesses

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

This option may increase industry and investor confidence in EMR, but only addresses concerns in relation to competitive advantages conferred on other NG business interests. This option is unlikely to allay industry fears that EMR information may be used by TO/SO to their disadvantage, so industry may still withhold or submit inferior evidence for the EMR Delivery Plan process.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		77	**969**
Best Estimate	N/A		12	**147**

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

This option could further mitigate the risk of conflicts of interest arising with National Grid's businesses (and provide benefits in terms of avoided resource costs) that sit outside NGET. Based on KPMG's assessment of the likelihood of these conflicts arising (0% to 33%, with a recommended best estimate of 5%, based on a 'Value at Risk' approach), it is estimated that the potential avoided resource costs (hence benefits) for each of the relevant NG businesses would be as follows: Offshore (**£0-£62m**), Interconnectors (**£0-£0.03m**) and NG Carbon (**£0-£429m**), as well as its UK gas businesses (**£0-£478m**). In total, these cumulative resource costs – in Present Value terms for 2014-2030 – are estimated to be between **£0-£969m**, with a best estimate of **£147m**.

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

All of the synergies between the System Operator and EMR roles are retained – i.e. this option has a full synergy score of 5. These allow EMR to be delivered at a lower cost, improve the quality of the analysis used to support Ministerial decisions and capitalise on the SO experience administering processes similar to those that are run for EMR. They could help the SO deliver its existing role more efficiently, reducing costs to consumers.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

In addition to assumptions noted in the previous option we have assumed:

- The current ring fence around NGET is fully effective at mitigating existing conflicts, but may not be entirely effective at mitigating conflicts arising from the new EMR delivery role.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs:	Benefits:	Net:	No	N/A

Summary: Analysis & Evidence: Policy Option 3

Separation of SO: Business separation of the combined System Operator and EMR functions from the Transmission Owner business

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2014	Time Period Years 17	Net Benefit (Present Value (PV)) (£m)		
			Low: -550	High: 1,023	Best Estimate: -161

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	25	1	9	**117**
High	83		43	**550**
Best Estimate	54		26	**334**

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

This option results in high compliance costs, due to the separation of two currently integrated business functions (the SO and TO). There may be alternative forms of separation, such as functional (requiring separation of employees and physical location of functions) or legal (requiring the businesses to be split into legally separate companies) with different cost profiles. Based on analysis undertaken by Ofwat[3] on the costs of separation in the water sector (a similar regulated sector) the total compliance costs are estimated to range between **£117m-£550m**, with a best estimate (mid-point) of **£334m**.

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

Analytical synergies between EMR and SO roles that are dependent on inputs from TO would be lost, though these are considered relatively minor. Conflicts of interest due to SO's existing activities remain, but these have not been quantified.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		90	**1140**
Best Estimate	N/A		14	**173**

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

This option would mitigate most risks of conflicts of interest arising (though conflicts between SO and EMR functions would remain) and therefore generates benefits in terms of avoided resource costs. These potential benefits, based on KPMG's assessment of a low probability range (0%-33%, with a recommended best estimate of 5%, based on a 'Value at Risk' approach) are estimated to be as follows: for National Grid's competitive businesses (**£0-£490m**), gas & electricity TO business (**£0-£648m**). Therefore, the total cumulative avoided resource costs (hence benefit) in Present Value terms for the period 2014-2030 is estimated to range between **£0-£1,140m**, with a best estimate of **£173m**.

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

The majority of synergies between the SO and EMR roles are retained. These synergies allow EMR to be delivered at a lower cost, improve the quality of the analysis used to support Ministerial decisions and capitalise on the SO experience administrating processes similar to those that are run for EMR. They could help the SO deliver its existing role more efficiently, reducing costs to consumers. These are the most valuable synergies; as a result, this option scores 4.3 under the multi-criteria analysis of synergies. It would also provide increased investor and industry confidence in EMR.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

In addition to the assumptions already outlined, in this option we have assumed that:

- Evidence on costs of business separation from other regulated utility sectors (e.g. water) is a good proxy for such costs within the energy sector
- There is a simple and direct relationship between separation costs and the size of an organisation that allows costs to be estimated on the basis of extrapolation. We had a choice of two scaling factors, employee numbers and customer numbers for this extrapolation. We have taken a cautious approach and upscaled costs based on customer no's as it is a higher scaler of the two.

[3] http://www.ofwat.gov.uk/competition/review/pap_pos_090716threshold.pdf

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs:	**Benefits:**	**Net:**	No	N/A

Summary: Analysis & Evidence: Policy Option 4

Separation of EMR functions: Business separation of the EMR functions from the combined System Operator and Transmission Owner business.

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2014	Time Period Years 17	Net Benefit (Present Value (PV)) (£m)		
			Low: -119	High: 1,131	Best Estimate: 109

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	1	0.72	**9.1**
High	0.03		9	**119**
Best Estimate	0.015		4.9	**64**

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

Compliance costs of implementing the separation measures can range from zero to full legal and functional separation, which involve setting up a separate company in new offices with its own facilities. Physical separation is expected to occur within existing National Grid premises but this may incur some costs (e.g. swipe-card access, partitioning of office space). These compliance costs have been assessed on the basis of discussion with stakeholders, historic data and research of current market prices. One off set-up costs could range between **£0-£0.03m,** with ongoing costs ranging from **£0.72m-£9m** The total costs of this option on a PV basis (2014-2030) are estimated to range between **£9.1m-£119m,** with a best estimate of £64m.

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

The most valuable synergies between the SO and EMR functions are lost for the most severe form of separation – this scored a range of 1.7 and 2.7 (out of 5) in our qualitative assessment of synergies. This leads to duplication of work, increased administrative costs and less efficient EMR outcomes. Losing the integrated EMR/SO analytical function could lead to lower quality analysis, thus inefficiently-set CfD strike prices and under/over-procurement of capacity. The SO would also be unable to realise any synergies which could lower existing costs to consumers through reduced balancing services costs (such as the Short Term Operating Reserve) to the extent that this synergy is able to be realised.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		90	**1,140**
Best Estimate	N/A		14	**173**

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

This option would mitigate all risks of conflicts of interest arising and provide benefits in terms of avoided resource costs. These potential benefits, based on KPMG's assessment of a low probability outcome (0%-33%, with a best estimate of 5%) are estimated to be as follows: National Grid's competitive businesses (**£0-£490m**), gas and the electricity TO business (**£0-£648m**).In total, the cumulative avoided resource costs/benefits in Present Value terms for 2014-2030 are estimated to range between **£0-£1,140m**, with a best estimate of **£173m**.

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

This should fully assure investors and industry, providing them with full confidence in the delivery of EMR. This scored a 5 under our qualitative assessment of how well it meets policy objectives, one of which is investor confidence in EMR.

Key assumptions/sensitivities/risks **Discount rate (%)** 3.5

In addition to the assumptions already outlined, in this option we have assumed that:

- Costs are based on undertaking separation measures early, and costs are lower than if separation was required after some integration had already taken place
- In making assumptions about stakeholder confidence in the mitigation of conflicts we have made no assumptions about the levels of stakeholder confidence in the new and separate EMR entity

BUSINESS ASSESSMENT (Option 4)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs:	**Benefits:**	**Net:**	No	N/A

Summary: Analysis & Evidence: Policy Option 5

Targeted EMR separation: Some EMR delivery functions are separated within SO, with a data handling team to protect confidential data

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2014	Time Period Years 17	Net Benefit (Present Value (PV)) (£m)		
			Low: -29	High: 1,131	Best Estimate: 154

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	1	0.72	**9.1**
High	0.05		2.3	**29**
Best Estimate	0.025		1.5	**19**

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

This option creates two broad areas of compliance costs: the implementation of separation measures for the EMR 'administrative' functions, and the creation of a data handling team to ensure data confidentiality. One-off set-up costs of functional separation could range between **£0-£0.05m** with ongoing costs ranging from **£0.72m-£2.3m**. On a Present Value basis (for 2014-2030) total costs are estimated to be **£9.1m-£29m,** with a best estimate of £19m.

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

Some loss of synergies between EMR and SO roles, resulting in duplication of work, increased administrative costs and less efficient EMR outcomes. These include economies of scope which are foregone, e.g. leveraging SO's experience of running auctions. While this option prevents indiscriminate movement of staff between functions, it is possible for staff with similar experience to work exclusively on EMR for agreed periods, which can help to deliver some of the benefits associated with leveraging experience from the delivery of similar functions.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	N/A	N/A	0	**0**
High	N/A		90	**1,140**
Best Estimate	N/A		14	**173**

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

This option would mitigate the risks of conflicts between the SO and integrated EMR function through a data handling team to aggregate and anonymise data from industry. Other possible conflicts of interest are eliminated through a degree of business separation and provide benefits in terms of avoided resource costs. These potential benefits, based on KPMG's assessment of a low probability outcome (0%-33%) are estimated to be as follows: National Grid's competitive businesses (**£0-£490m**), gas and electricity TO business (**£0-£648m**).In total, the cumulative avoided resource costs (hence benefits) on a Present Value basis for 2014-2030 are estimated to range between **£0-£1,140m**, with a best estimate of **£173m**.

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

Key synergies around some of the EMR functions are retained, which allows SO to utilise existing market expertise in providing analysis on levels of capacity to contract for and CfD strike prices. Not leveraging this expertise to improve analysis to Government can lead to incorrect/inefficient CfD strike prices and levels of capacity. Experience gained in fulfilling the EMR role could also lead to efficiencies for the SO, improving the quality of service to customers and leading to operational efficiencies that could further reduce the cost to consumers. This scored 3.4 (out of 5) in our qualitative assessment of the impacts of this option on synergies.

Key assumptions/sensitivities/risks	**Discount rate (%)**	3.5

In this option we have additionally assumed:

- Data handling provides additional confidence to stakeholders regarding confidentiality concerns
- National Grid's internal incentives and codes of employee conduct create no advantage for individuals to act on potential conflicts
- It is not possible, at the level of aggregation suggested, to identify from industry information a single plant which would have a material impact on the way in which National Grid would conduct its business.

BUSINESS ASSESSMENT (Option 5)

Direct impact on business (Equivalent Annual) £m:			**In scope of OIOO?**	**Measure qualifies as**
Costs:	**Benefits:**	**Net:**	No	N/A

Table of Contents

Overview

1. This impact assessment considers options for mitigating the risk of conflicts of interest arising from the Great Britain System Operator within National Grid acting as the delivery body for Electricity Market Reform (EMR)[4].

2. NGET is a private company that is the integrated electricity System Operator for Great Britain and the England and Wales Transmission Owner, for which it is licensed under the Electricity Act 1989 by Ofgem. NGET's overarching duty under the Electricity Act 1989 as the transmission licensee is to develop and maintain an efficient, co-ordinated and economical system of electricity transmission. More detailed information on National Grid is provided in Annex A.

3. Reflecting the synergies between the roles of the electricity System Operator (SO) and the Electricity Market Reform (EMR) delivery body, in December 2011 Government announced its intention to designate the SO as the delivery body for EMR[5].

4. As the EMR delivery body the System Operator would be expected to:

    - Provide analysis to inform key Government decisions on EMR

    - Administer the two key EMR mechanisms: allocating Contracts-for-Difference (CfDs) and running auctions for capacity under the Capacity Market.

5. As well as synergies, National Grid's role in the UK energy system presents potential conflicts of interest between its existing roles and the new EMR delivery body functions. DECC and Ofgem have undertaken a joint project, which included analysis by external consultants KPMG to identify these potential conflicts, assess their materiality and propose mitigating action if shown to be necessary.

6. Three main types of potential conflict were identified:

    - Conflicts that result from National Grid obtaining information through its EMR role about aspects of the market or Government policy that could create a commercial advantage;

    - Influence over the direction of Government policy, whether to favour the building of future transmission/distribution assets and gas-related investments or use of and reinforcements of existing assets; and

    - The ability to make decisions in the exercise of the EMR functions that allow it to assist projects that are aligned to the company's own commercial interests.

7. A number of measures have been considered as part of the design of EMR which would act to mitigate against the risk of conflicts. These will be expanded in the next section and include:

    - Transparency & scrutiny: The analysis that National Grid provides as part of its delivery functions will be subject to scrutiny by a Panel of Technical Experts[6], and public consultation to ensure that the analysis is high-quality and objective

    - Limits on discretion: National Grid will be expected to run mechanistic processes under rules clearly and transparency set out by Government or Ofgem.

    - Governance and accountability: National Grid will operate within a governance and accountability framework ensuring its performance is measured and that its EMR activities are run economically and efficiently.

[4] Note that while the policy proposals within this IA are the result of a joint DECC/ Ofgem project, this IA has been prepared by DECC without input from Ofgem.
[5] https://www.gov.uk/government/publications/planning-our-electric-future-technical-update
[6] https://www.gov.uk/government/policy-advisory-groups/electricity-market-reform-panel-of-technical-experts

8. However, these measures may not entirely eliminate the potential for conflicts of interest to manifest and further action may be required. We have considered whether, in addition, business separation is required.

9. Business separation aims to create a barrier (or ring-fence) between two or more different activities, functions and interests to avoid conflicts. A further explanation of business separation is available in Annex B.

10. For the purpose of this assessment we have considered a variety of options in respect to the location and strength of the business separation measures.

Table A: Options Description

Option	Description
Option 1: Do Nothing	No ring-fencing; rely instead solely on mitigations designed into EMR to manage conflicts of interest. Retain all existing synergies and incur no additional costs
Option 2: Ring-fence NGET	Extend the existing ring-fence between NGET and the rest of NG to incorporate new EMR functions. Addresses all conflicts, except those between TO and SO/ EMR. Retains all synergies and incurs no costs if no need to strengthen existing separation measures
Option 3: Ring-fence SO	Split currently integrated SO and TO. Addresses all conflicts, except those between EMR functions and SO. Lose some synergies with TO, but retain majority; the most costly option overall.
Option 4: Ring-fence theEMR functions	Create functionally-separate EMR unit within NGET. Should mitigate all conflicts of interest, but loses almost all synergies (depending on the strength of ring-fence).
Option 5: Targeted EMR separation	Designed to mitigate all conflicts, whilst retaining most important synergies. Ring-fences administrative EMR functions, but retains analytical team within the SO. Director responsible for this team has obligations (via licence) to ensure conflicts avoided, effectively creating a ring-fence. Also, a data handling team will anonymise and aggregate data provided by industry, removing potential informational advantage. Similar cost to low-level functional unbundling of EMR functions (a sub-option of option 4).

11. In assessing the options described above we have considered:

- Benefits of avoided conflicts – where the option reduces the risk of conflicts of interest arising
- The potential loss of synergies resulting from the business separation measures in each option
- The compliance costs of implementing the business separation measures, for example if a separate physical location is required.
- Stakeholder confidence – The impacts on stakeholders of real or perceived conflicts of interest arising.

12. The assessment was informed by analysis from KPMG, stakeholder engagement in the joint DECC-Ofgem project, including the responses to the consultation issued in November 2012 and research. KPMG have assessed the probability of each conflict arising and the likely impact, in terms of additional profit for National Grid of exploiting such a conflict and associated resource cost to society.

13. The table below summarises the assessment of each of the options, where it has been possible to monetise the impacts:

Table B: Summary –cost benefit analysis

Option	Best estimate of Present Value, £m (2014-2030)		
	Costs	Benefits	Net benefits
1 – Do nothing	173	0	**-173**
2 – Separation of NGET	0	147	**147**
3 – Separation of SO	334	173	**-161**
4 – Separation of EMR	64	173	**109**
5 – Targeted EMR separation	19	173	**154**

14. Option 5, which offers a hybrid solution (which separates some EMR functions while maintaining the analytical function within the SO), has the highest NPV of all the options. It removes the risk of conflicts of interest and therefore secures benefits of equal or greater value to other options considered. Compliance costs are also lower for this option relative to the other separation options (up to 2.5% of the potential benefits).

15. Some of the analysis, such as stakeholder confidence and the preservation of synergies, is difficult to measure quantitatively. We have therefore sought to incorporate this into our assessment via multi-criteria analysis, which we have used to test the conclusions from the cost-benefit analysis above.

16. Each option has also been assessed against how well it meets a number of objectives, on a scale of 1 to 5 (where 1 represents a poor achievement against the objective and 5 a strong achievement against the objective) and weighted according to relative importance of each objective in meeting the overall policy goal. Mitigating conflicts has been afforded the greatest weight as this represents the greatest monetised costs and the highest risk to EMR success.

Table C: Objectives assessment

Objective	Weighting (%)	Option 1	Option 2	Option 3	Option 4	Option 5 (preferred)
Mitigation of conflicts	40	1	3	4	5	4
Stakeholder confidence	10	1	2	4	5	4
Synergies retained	25	5	5	5	1	4
Minimises compliance costs	25	5	5	1	3	4
Weighted Total (out of 20)		**3.9**	**3.75**	**3.5**	**3.5**	**4**

17. According to this multi-criteria analysis, Option 5 is again the preferred option. As well as offering mitigation of conflicts of interest and entailing relatively low compliance costs, this option importantly retains the key synergies and addresses fundamental stakeholder concerns through the creation of a data handling team and separation of the EMR 'administrative' functions.

18. We therefore propose to take this option forward through the exercise of powers within the Energy Bill, subject to the passage of the Bill through Parliament. We intend to consult on the measures in the Autumn.

Problem under consideration

19. As set out in the overview section, the EMR delivery role was will be conferred on the System Operator (within NGET) due to the strong 'synergies' with its existing role – i.e. where it has the existing information, knowledge, experience, expertise and skills that would allow it to deliver EMR more effectively and efficiently than any other delivery body. These synergies could result in benefits to consumers and taxpayers from the lower cost and the more effective delivery of EMR and its associated policy objectives. More detail on the synergies is set out in Annex F.

20. However, as well as synergies, National Grid's role in the UK energy system also presents potential conflicts of interest. National Grid's main business activities are ownership of the electricity transmission system in England and Wales, ownership of the gas transmission system and 4 of the 8 regional gas distribution networks[7]. These are all activities regulated by Ofgem.

21. It also has several businesses operating in competitive conditions:

- Interconnectors – National Grid is a 50% owner in two of the undersea cables that connect the transmission network to the continent.
- Offshore electricity transmission – this business competes in tenders for licences to run areas of the offshore transmission network in a competitive process run by the regulator Ofgem
- A Liquid Natural Gas import terminal
- Carbon capture and storage – NG is part of a consortium which is a preferred bidder in the Government CCS competition. NG provides the transportation aspect of CCS.

22. As a private company, there are risks that National Grid's corporate interests may not fully align with the public interest of its EMR functions. It is important to note that National Grid has already dealt with significant potential conflicts of interest in regards to existing regulated and non-regulated business activities, as set out in Annex A.

23. DECC and Ofgem recognised these potential conflicts of interest between National Grid's existing businesses (including its existing transmission/distribution assets, such as the gas network) and the new EMR functions it would be taking on. The various conflicts have been categorised into 3 types set out below – a full list is in Annex C.

- **Access to information**. National Grid will have access to some new information through the EMR delivery role. For example, this could include data on the costs of different renewable technologies. In addition, it will have foresight of Government policy intentions due to its provision of analysis to support key Ministerial EMR decisions. Examples of where conflicts may arise due to this access to additional information include:

  - The information could give those National Grid businesses that operate in competitive markets information on their competitors' businesses.

  - If National Grid's competitive businesses were to have advance knowledge of Government intentions – for example knowing that there will be more interconnectors, CCS, gas (Liquified Natural Gas) or offshore generation – this could allow these businesses to have a first-mover advantage, i.e. take advantage of the new market conditions that Government policy would bring about.

- **Ability to influence Government decisions.** As outlined above, National Grid will provide analysis to Government to inform key EMR decisions, for example on CfD strike prices or the amount of capacity to contract for. Through this analysis it could influence Government to take decisions that would unduly benefit its businesses. Examples of where conflicts may arise due to this ability to influence Ministerial decisions include:

  - Over procurement of capacity in the Capacity Market - Greater amounts of flexible generation (e.g. gas) on the system makes it easier for the System Operator to balance the

[7] Annex A details National Grid's key business activities

system and thus meet its licence obligations. It could also ensure greater revenues to its electricity transmission and gas transmission businesses.

- Influencing Government to benefit sectors that National Grid has an interest in – if Government is influenced to unduly support technologies such as CCS, Interconnectors, offshore generation or gas, it would provide NG the opportunity to gain a share in a larger market than would otherwise have been the case.

- Influencing Government to benefit existing National Grid assets – for example, given that National Grid gains revenues from the utilisation of the existing gas transmission/distribution network, it may have a financial incentive to influence Government to favour gas generation in the future, as more low-carbon generation comes on stream.

- **Ability to make decisions, where it can exercise discretion** – in administrating the capacity market and CfD processes NG will have to make decisions regarding eligibility and allocation and it could discriminate in favour of projects that help its business interests:

  - Preferring projects within NG's geographic monopolies – National Grid is the Transmission Owner in England and Wales but not Scotland, Northern Ireland and for the Offshore network. Generation built in England and Wales means National Grid has to build more lines to connect the different geographic locations.

24. To mitigate conflicts of interest arising we are designing the following measures into EMR and the role of the delivery body:

    - Transparency & scrutiny. The analysis that National Grid provides as part of its delivery functions will be subject to scrutiny by a Panel of Technical Experts[8], whose job it is to scrutinise the quality of this analysis. The analysis will also be subject to public consultation where appropriate, for example where the analysis is used to inform Ministerial decisions on setting support levels for renewable technologies. This will ensure that the analysis is high-quality and objective
    - Limits on discretion. National Grid will have limited or no discretion in carrying out its role, and will be expected to run mechanistic processes under rules clearly and transparently set out by Government or Ofgem. There will also be an appeals process to allow decisions to be challenged.
    - Governance and accountability. National Grid will operate within a governance and accountability framework once secondary legislation is in place, which will ensure that it knows what it is required to do in its delivery role. Government will set out its role clearly and prescriptively in secondary legislation. Ofgem will continue to regulate the System Operator, monitor its performance and seek to ensure that its EMR activities are run economically and efficiently.

25. These measures may not eliminate the potential for conflicts of interest to manifest and further action may be required. We have considered whether, on top of the mitigations within EMR design, business separation is required.

[8] https://www.gov.uk/government/policy-advisory-groups/electricity-market-reform-panel-of-technical-experts

Rationale

26. As EMR delivery body, National Grid will potentially have the ability to influence Government decisions through the analysis it provides and, if it were to exercise any discretion, in the allocation of CfDs and Capacity Market agreements. This could allow National Grid to exploit its advantage and shape the energy market to offer more opportunity for profit amongst its businesses.

27. As an economic principle, information is needed for a market to operate efficiently. This information must be available fully to both sides of the market, and where it is not, market failure may result, this is known as 'asymmetry of information'.

28. In this context information[9] asymmetry could manifest itself with regards to flows of information between National Grid and Government and/or the use of commercially-privileged information by National Grid. The previous section highlighted the categories of conflicts, Table 1 below shows how each of those categories links with the problem of information asymmetry.

Table 1: Rationale for Intervention

Conflict Category	Example	How information asymmetry problem arises
Access to information	NG competitive business gaining access to information other companies provide for the EMR processes (evidence for the Delivery Plan or as part of an application for the Capacity Market or CfD) or early sight of Government intentions in energy policy could provide a commercial advantage	Information asymmetry due to NG having more information than the market due to its EMR role and hence gaining a competitive advantage in its commercial business. This asymmetry of information can create market distortions and inefficient outcomes can occur, leading to welfare losses to society.
Influencing Government	NG could influence Government decisions through the analysis it provides to Government creating a future market more profitable to NG interests. For example, it could influence Government to over-procure capacity in the Capacity Market, leading to more network build in England and Wales, where it is the Transmission Owner.	Information asymmetry in that Government is highly reliant on receiving advice/analysis from a single supplier, who has control on the collation of information and its presentation (hence could be selective in information it shares with Government). Much of this information will be unique to its business and or its EMR role.
Exercise of discretion	In administrating the capacity market and CfD processes NG will have to make decisions regarding eligibility and allocation, abusing its discretion it could discriminate in favour of projects that help its business interests.	There is an information asymmetry in Government not being able to fully observe NG processes and procedures and not necessarily knowing when NG has exercised any discretion

[9] We consider information here in a broad sense to not only includes market intelligence, but information flows/transfers between National Grid and Government with regards to analysis and advice on specific choices being made.

Options under consideration

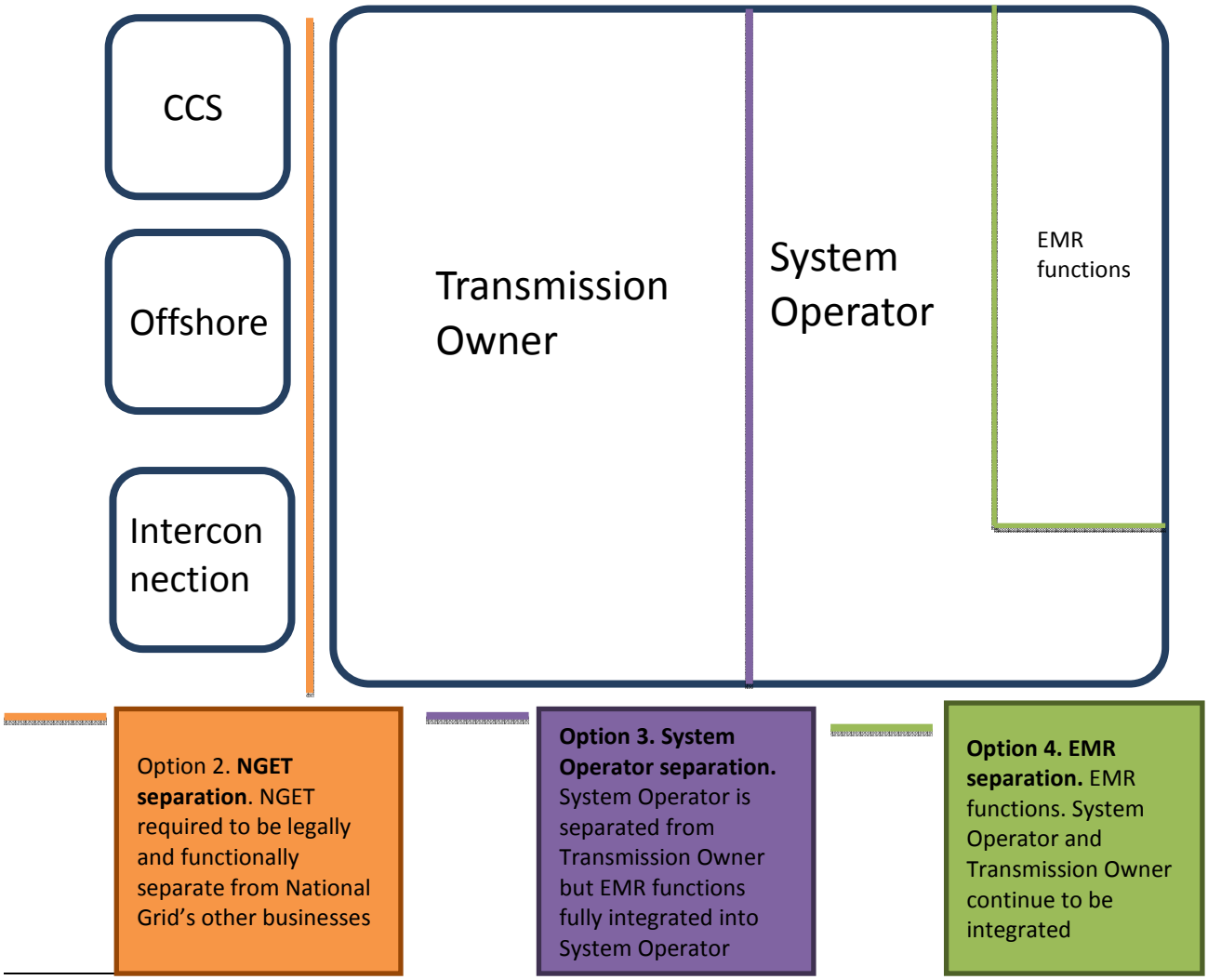
29. To mitigate the risk of conflicts of interest arising, set out in the rationale section above, this Impact Assessment considers four models of business separation that could be implemented.

30. Business separation is typically used to address conflicts of interest within various sectors, including telecommunications, energy and banking. It aims to create a barrier between two or more different activities, functions and interests to avoid conflicts. It is also known variously as chinese walls, ring-fencing and unbundling[10].

31. In the case of NGET we have considered where within, or around, the company, these business separation measures could sit in order to most effectively mitigate conflicts of interest. We have considered 4 options of business separation, in addition to the 'do nothing' option:

- Option 1: Do Nothing
- Option 2: Separation of NGET
- Option 3: Separation of the System Operator activities
- Option 4: Separation of the EMR functions
- Option 5: Targeted EMR separation (a hybrid option).

32. The diagram below shows the structure of NGET and where these ring fences would sit. This is key to understanding which of National Grid's interests, if any, are kept separate from the EMR delivery functions. These divisions represent a specific mitigation option, which can be analysed to determine what synergies are lost and what costs incurred in the event that they were implemented. Option 5 is not represented here but would have the EMR analytical functions integrated into the SO, with the 'administrative functions' (allocating CfDs and running the Capacity Market auction) separated.



[10] A further explanation of business separation is available at Annex B.

33. Under Option 2, for example NGET is separated from other parts of NG. While insulated from potential conflicts with those businesses outside of the ring fence, any potential conflicts within the ring-fenced entity may not be mitigated. This needs to be traded off with the potential loss of any synergies if business separation is put in place. This is considered in more detail when assessing the costs and benefits of each option.

34. As well as considering the perimeter of the ring fence, we have also considered how strict those business separations should be. Annex B sets out the different levels of business separation, of which there are two broad categories:

    - Functional separation: Separation of IT, employees and premises
    - Legal separation: Separation into a legally distinct company

35. This impacts on the effectiveness of mitigating conflicts of interest. In theory, the stricter the ring-fence, the greater protection against conflicts of interest. Again this is inversely related to the retention of synergies: the lighter touch the separation measures, the greater the likelihood of retaining the synergies.

Cost-benefit analysis

36. As outlined in the overview section, to determine which option should be preferred, we have considered the following impacts:

    - The compliance costs of implementing the business separation measures, for example if a separate physical location is required.
    - Benefits of avoided conflicts – where the option reduces the risk of conflicts of interest arising
    - Stakeholder confidence – The impacts on stakeholders of real or perceived conflicts of interest arising.
    - The potential loss of synergies resulting from the business separation measures in each option

37. The first two of these are quantified through evidence gathered through the call for evidence and analysis carried out by KPMG, as well as evidence from previous experience of business separation and knowledge of how the EMR functions are being set up. The second two are not quantified in the same way, though are subjected to multi-criteria analysis.

Monetised Costs and Benefits

Compliance costs

38. These are the costs of implementing any separation and can be one-off or ongoing costs. The cost of implementing measures to comply with the business separation varies depending on the option chosen.

39. One-off costs could consist of:

    - Building a separate IT system;
    - Acquiring new premises;
    - Setting up a new remuneration scheme;
    - Recruiting a large intake of new staff, at all levels of seniority.

40. Ongoing costs would mostly consist of maintaining these – for example, the salaries of the additional staff required by the separation.

41. We have used different methodologies for assessing the compliance costs under each option and these are represented below. We have considered a range of sources including Ofwat, National Grid, Ofgem and DECC internal sources. These are presented under each option.

Benefits of conflicts avoided

42. Within the 3 categories of conflicts (access to information, ability to influence, and exercising discretion) there are several specific conflicts that could arise between the new EMR role and the interest of different National Grid businesses.

43. These can result in greater profits for one or more National Grid businesses. There are also wider costs, which would be borne by society (a resource cost). For example if NG uses EMR to bring more generating capacity on the system than necessary, this could result in additional profits for its transmission businesses. However, the cost of those unnecessary power plants would be paid for by consumers.

44. KPMG have conducted an extensive analysis of the conflicts of interest that could arise.

45. To assess the materiality of potential conflicts of interest, KPMG analysed both the probability of a conflict arising and the financial impact on National Grid's profits as a consequence of acting on any conflict. The assessment was based on a series of tests developed by KPMG and modelled by Pace Global (a Siemens Business) using DECC, Ofgem and publicly available data.

46. In considering probability, KPMG considered 'executability' (the ease with which National Grid is able to act on a potential conflict, given the type of conflicts and the design of the relevant EMR elements), 'detectability' (the ease with which National Gird's potential action could be detected) and 'consequence' (the potential consequences to National Grid if its action were detected).

47. By considering the impact of conflicts of interest if they arise, and the probability of them arising, KPMG was able to reach conclusions on the materiality of these conflicts.

48. The analysis drew two main overall conclusions:

- The potential additional profits to National Grid from acting on conflicts of interest is around £50m - £70m (on a Net Present Value basis) between now and 2030. This is equal to approximately 3% of NG's annual earnings attributable to shareholders[11].
- The probability of nearly all of the conflicts arising is low.

49. In reaching these conclusions, KPMG analysed each potential conflict of interest in turn. The full list of conflicts of interest, their likelihood of arising and the potential financial gain for National Grid if they were to arise is set out in Table 2.

Table 2: Conflicts of Interest[12]

Category	Conflict ID	Conflict of interest	Probability	Impact (NPV until 2030)[13]
Information	1A	Advance knowledge of potential generating sites allows the TO to acquire land and subsequently sell it at a profit.	Zero	N/A
	1B	Access to business privileged information on likely future gas build benefits NG electricity and gas network businesses. The information may give NG TO businesses an advantage in CAPEX baselining process under RIIO[14].	Low	£0
	1C	NG Offshore Transmission business has access to offshore capacity procurement information that can give it a first mover advantage.	Low	£8m
	1D	NG interconnector business can benefit from early access to EMR information (CM, CfD) providing NG with price volatility information.	Low	£0 for new IC; £2m for existing IC
	1E	NG CCS business benefits from advance information when taking part in CfD analysis and allocation process and the capacity market administration run by the SO.	Medium	£<0.2m
	1F	NG's Gas LNG business may benefit from advance information on the potential future demand for gas, given likely EMR outcomes (e.g. CfD strike prices).	Low	N/A

[11] Even though the magnitude of the associated profit is relatively low, the wider resource costs to society from the exercise of these conflicts could be more significant, as outlined further below

[12] Those given an N/A impact are where it was so unlikely NG could act upon the conflict that it was not a proportionate use of KPMG time to model the impacts, the impact were so low as to be negligible, or it there was not appropriate evidence on which to base the modelling and it was not proportionate use of resources to gather it.

[13] As per footnote 2

[14] Refer to RIIO

Influence and Discretion	2A	Influence or discretion by the EMR team to over-procure capacity (CM) or favour a flexible generation mix (CM, CfD) to facilitate meeting license obligations e.g. balancing the system.	Low	N/A
	2B(1)	Influence or discretion by the EMR team to over-procure capacity for the benefit of NG's electricity and gas TO (the analysis examined a 2% higher capacity margin).	Low	£14m-£35m
	2B(2)	Influence or discretion by the EMR team to lower notional efficient TO costs under RIIO.	Low	N/A
	2B(3)	Influence or discretion by the NG EMR team to locate CfD and CM capacity in England and Wales rather than Scotland	Low	N/A
	2C	Influence or discretion by the EMR team to favour technologies that offers better opportunities for TO profits.	Low	N/A
	2D	Influence or discretion by NG's EMR team to favour generation solutions over demand side reduction (DSR) to benefit the TO.	Medium (moving to low)	£5m
	2E	Influence or discretion by the EMR team to benefit NG's gas businesses (storage, TO, SO) through over-procurement of capacity or encouraging a focus on gas-fired generation[15].	Low	£2m
	2F	Influence to raise the cost of capital used in EMR analyses to benefit regulated businesses.	Zero	N/A
	2G	Influence or discretion by the EMR team to place weight on technologies to favour particular new or existing business (CCS/IC/Offshore) in CM or CfD instruments.	Low	£<0.1 (CCS) to £20m (IC)

50. For conflicts 2E and 2B(1), KPMG's analysis of conflicts focuses on those relating to new network build due to new gas plant being built. However as part of the conflicts assessment KPMG also considered conflicts that relate to extending the asset life of the network due to gas plant not being retired but staying online[16]. In consultation with Ofgem, KPMG agreed that the assessment of this potential conflict is essentially covered under new build, as given by 2E and 2B(1). New build should result in a higher pipeline capex requirement than extending the life of the pipeline to service the life of an existing plant that is kept open. The actions required by National Grid to execute the conflict between new build and maintaining an existing plant connected to the network system are similar/identical, however new build would provide the higher income stream (on a like-for-like basis).Therefore, KPMG worked from the basis of new build as this would cause the greatest cost and thus a more conservative estimate of the potential resource costs.

51. While the KPMG analysis suggests that the profits to National Grid and likelihood of it acting upon the conflicts are relatively low, we have also considered the costs to society, if National Grid did exploit these conflicts of interest.

52. We have used the KPMG analysis to monetise these impacts in terms of the risk of conflicts of interest arising under each option. The resource costs associated with each conflict of interest

[15] This is based on bringing new build plant onto the system rather than retaining closing plant. The latter would still see an over procurement of capacity and a greater use of the gas network. KPMG worked from the basis of new build as this would cause the greatest cost and thus a more conservative estimate. Existing plant would fall somewhere below the figure based on new build.

[16] DECC also posed the question if National Grid gets revenues for its existing regulated asset base (which has a regulated asset value - RAV) for gas on a volume metric basis will more gas also allow it more revenue? It has been confirmed that NG revenues are not volume dependent in this way and so this is already mitigated by the way the regulatory regime provides for the return on the RAV.

provides the estimates of the benefits to society from mitigations of those conflicts through policy interventions. This risk, if avoided through Government intervention, is used to estimate the benefits.

53. The below table has the adjusted resource costs[17] which reflects the welfare losses to society (from the inefficiencies arising due to National Grid acting on the conflicts). Further detail on how these figures have been derived is in Annex D.

Table 3: Resource costs and National Grid profits from conflicts of interest

Conflict	Description	Resource cost (PV, £m, 2010 real)			National Grid profits (PV, £m, 2010 real)		
		Low	High	Best	Low	High	Best
1c	Offshore TO first mover	-	-	-	0	4.7	0.55
1d	Interconnector revenue	-	-	-	0	1.2	0.16
1E	CCS advance info	-	-	-	Negligible		
2b(1)	2% higher margin	0	648	98	0	6.4	0.96
2d	More gen rather than DSR	0	490	74	0	2.1	0.32
2E	More gas favours NG gas business	0	462.5	70	0	0.9	0.13
2G	more CCS	0	429	65	Negligible		
	More IC	0	0.03	Neg	0	7.6	0.99
	More wind	0	62.5	9	0	0.4	Neg

*Figures are rounded

54. We use these estimates of resource costs to society to estimate our benefits where these conflicts of interest are avoided through the different options presented in this IA.

Non-monetised Costs and Benefits

55. We have not been able to quantify all the potential cost and benefits. Therefore, we have also provided some qualitative analysis on the following impacts, some of which have been subjected to multi-criteria analysis. We used this to test the results of the analysis of the monetised impacts set out above – though the monetised cost-benefit analysis is the primary driver of our preferred option.

Stakeholder confidence

56. Key to the success of EMR is the confidence of stakeholders so that they are willing to participate. Throughout this project we have engaged extensively with stakeholders to understand their concerns on this issue, and evidence from that process – including that submitted through the call for evidence – has been reflected here.

57. They have highlighted that they are worried about National Grid exploiting these conflicts, particularly that it may use the information it receives to benefit its market position. This could lead to stakeholders refraining from submitting evidence to National Grid that is required for it to draw up key EMR analysis, including analysis to inform CfD strike prices. Another potential risk is that concerns over the System operator could lead to higher investment costs[18].

58. It should be noted that an existing, well-known body with an established track record like the System Operator should garner more stakeholder confidence in the delivery of EMR through its current practices than if an entirely new and unproven body was created.

Synergies

59. There are benefits to integrating the EMR delivery role into the SO and continuing to integrate the System Operator role into the Transmission Owner. These may be lost depending on the degree of

[17] Resource costs relate to the capex costs of new network and generation capacity, in addition to the generation and carbon costs associated when operating the generation capacity relative to a base case scenario.
[18] These are explored in more detail in Annex G.

separation. Whilst we have not been able to quantify these synergies a detailed qualitative assessment (based on assessments by KPMG) is given in Annex F.

60. We have used the KPMG analysis to qualitatively assess the options in terms of their benefits where synergies are retained (i.e. where the level of ring fencing still allows the synergy to be realised) or their cost, where a proposed option prevents a synergy from being realised. We have used a multi-criteria analysis to make these assessments on each option, following principles laid out in Government's Green Book guidance[19].

61. The below table will be used to rate each option on how well it preserves the 3 types of synergies set out in Annex F: operational, EMR outcomes and system synergies. They will each be scored out of 5 (where 1 represents a poor achievement against the objective and 5 a strong achievement against the objective). However, the overall total will be weighted so that the more valuable synergies are given greater weight. This value is a qualitative assessment of the cost savings for consumers the option will present and the likelihood of the synergy being realised.

62. The synergy addressing 'better EMR outcomes' are weighted highest, as it represents the greatest likely cost savings for consumers and more effective delivery of policy. Both 'Operational synergies' and 'System synergies' are given an equal weighting of 30% - although operational synergies represent smaller cost savings, they are much more likely to be realised; on the other hand, system synergies could result in much larger cost savings, but it is much less likely that they would be realised for the reasons set out in Annex F.

Table 4: Synergies assessment

Synergy	Weighting (%)	Score (1-5)	Qualitative explanation
Retains operational synergies	30		
Retains EMR outcome synergies	40		
Retains system synergies	30		
Weighted total			

Assessing the options overall

63. Of the costs and benefits set out above, we have been able to quantify the impact of conflicts of interest arising (or not arising) by using the KPMG analysis, and the compliance costs using evidence gathered from other examples of business separation. This analysis is the basis on which we have made our decision on the preferred option in this IA.

64. However we have not been able to quantify the impacts in terms of lost synergies or investor confidence and so, in order to test the results derived from the analysis of the monetised impacts, we have in addition developed qualitative analysis using multi-criteria analysis to ensure other key impacts are taken into account.

65. As part of this multi-criteria analysis, all options will be considered against the following criteria to assess how well they meet the policy objective:

- Maximise the mitigation of conflicts of interest
- Ensure stakeholder confidence in EMR
- Minimise lost synergies resulting from any business separation measures that are implemented
- Minimise the costs of implementing any measures

66. Table 5 below will be used in the appraisal of each option to assess how well the option meets the objectives in a 5-point scoring system (where 1 represents a poor achievement against the objective and 5 a strong achievement against the objective). Each of the objectives is weighted according to its importance in meeting the overall policy goal.

[19] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7612/1132618.pdf

67. Mitigating conflicts has been given the highest weight, as this represents the greatest monetised costs and highest risk to EMR's success. Objectives of minimising costs and retaining synergies are both weighted at 25%, as these both represent potential cost savings for consumers. Finally, we have weighted stakeholder confidence at 10%, based on our engagement with stakeholders and the concern they place on this issue, as well as the impact it would have on their participation in EMR.

Table 5: Objectives assessment

Objective	Weighting (%)	Scoring (1-5)
Mitigation of conflicts	40	
Stakeholder confidence	10	
Synergies retained	25	
Minimises costs	25	
Weighted Total		

Option appraisal

Option 1 (do nothing baseline): No business separation

69. This option would leave the current business arrangements of National Grid intact and is consistent with the original intention of having the EMR delivery role carried out by the System Operator (SO) within NGET.

70. There would be no controls over the flow of EMR information which could be shared around National Grid. EMR would be fully integrated with staff being able to work and move flexibly between EMR and other work within National Grid. Under this option there will still be the other mitigations in place to tackle conflicts of interest within the design of EMR, as set out above.

Costs – Costs of conflicts of interest arising

71. Under this option, all the potential conflicts identified in the KPMG analysis may arise.[20] The cost of this option arises from market distortion and inefficient resource allocation caused by National Grid exploiting these conflicts. If these conflicts are realised they could impose welfare costs on society and reduce the effectiveness of EMR in delivering its policy objective.

72. As mentioned earlier, KPMG has undertaken an assessment of the materiality of impacts and their probability for each of the potential conflicts (where probable and quantifiable). Based on this assessment (and applying KPMG's probabilities) Table 3 (with further detail in Annex D) shows the costs in terms of resource costs[21] to society (where incurred[22]) from each conflict and the potential profit implications for NG[23]. As can be seen the resource costs are estimated at £1,140m (with a best estimate of £173m) and potential NG profits estimated at £18m (with a best estimate of £3m).

Non-quantified benefits – Synergies retained

73. In this option all the synergies set out above and in Annex F are retained.

Table 6: Synergies assessment – Option 1

Synergy	Score	Qualitative explanation
Retains operational synergies (30%)	5	No separation so all synergies unaffected
Retains EMR outcome synergies (40%)	5	No separation so all synergies unaffected
Retains system synergies (30%)	5	No separation so all synergies unaffected
Weighted total	5	

Non-quantified impacts – investor confidence in EMR

74. This option would do nothing to improve stakeholder confidence. The perception that these conflicts of interest exist and could be acted on would persist. This could negatively impact stakeholder confidence leading to:

- Potential effect on the ability to deliver EMR objectives. Any impact on investor confidence could raise the cost of financing a project (hurdle rate).
- The greater impact from a lack of stakeholder confidence could be that it inhibits industry stakeholders' willingness to submit information for any analysis carried out for the purposes of

[20] It should be noted that whilst baseline costs are typically zero, here for presentational purposes we show the costs that arise from conflicts in the business as usual case. However all the policy options are assessed against a zero cost baseline assumption to express the benefits that society receives through the policy induced mitigations.
[21] These represent the net effect from changes capital expenditure on generating assets, generation and carbon costs and capital expenditure on network assets relative to a base case scenario.
[22] Conflicts that do not result in additional resource spending over the base/reference case scenario would only have a distributional (NG profit) impact.
[23] The NG profits figure is transfer from consumers to NG and hence represents a distributional effect under each conflict

informing key Ministerial decisions on EMR. This could impair the quality of the analysis leading to sub-optimal decisions on CfD strike prices and procurement of capacity in the Capacity Market.

75. This option also does not address stakeholders' concerns that this information could lead to an information asymmetry and thus a commercial advantage for the System Operator when negotiating for industry to provide other services, such as the contracts under the Short Term Operating Reserve[24]. This could, however, be considered a synergy as it could provide lower costs to consumers for balancing services.

Overall summary of option and cost-benefit assessment

76. This option does not remove the **risk of conflicts of interest** arising as identified in the KPMG analysis (though it is important to note that these conflicts may never arise, hence the lower bound estimate is zero). It does not come with any **compliance costs** as no business separation measures are implemented. Therefore in terms of monetised impacts, this has a NPV of -£173m.

Table 7: Cost-benefit analysis summary – Option 1

Category	Present Value (£m, 2010 real)		
	Low	High	Best estimate
Cost	0	1,140	173
Benefit	0	0	0
Net benefit	-1,140	0	-173

77. In terms of non-monetised impacts, it does not address the problem of **investor and industry confidence**, as the perception that conflicts of interest may occur remains. However it does retain key **synergies**. We have therefore given these impacts the following scores in order to allow for a comparison of the non-monetised impacts across the options and test the monetised key cost-benefit analysis above.

Table 8: Objectives assessment – Option 1

Objective (weighting)	Scoring
Mitigation of conflicts (40%)	1
Stakeholder confidence (10%)	1
Synergies retained (25%)	5
Minimises costs (25%)	5
Weighted Total	3

[24] http://www.nationalgrid.com/uk/Electricity/Balancing/services/balanceserv/reserve_serv/stor/

Option 2: NGET Ring-fence

78. This option would place a ring-fence around National Grid Electricity Transmission (NGET). NGET is already legally separate from other National Grid businesses; however, it is not completely functionally separated - for example NGET employees share offices in Warwick with staff from some other NG businesses. This option considers the cost of extending these measures to the EMR functions.

Benefits – Avoided costs of conflicts arising

79. Under this option, those conflicts with the businesses outside of NGET (i.e. the competitive businesses plus the gas network businesses) are avoided. These estimates are derived from the analysis carried out by KPMG, as set out in Annex D.

Table 9: Conflicts of interest resource costs (PV, £m, 2010 real)

Conflict	Description	Resource cost			NG Profits		
		Low	High	Best	Low	High	Best
1c	Offshore TO first mover	-	-	-	0	4	0.55
1d	Interconnector revenue	-	-	-	0	1	0.16
1E	CCS advance info	-	-	-	negligible		
2b(1)	Gas Transmission (2% higher margin)	0	478	72	0	5	0.8
2G	more CCS	0	429	65	negligible		
	More IC	0	0.03	neg	0	7.6	0.99
	More wind	0	62	9	0	0.4	neg
Total		0	969	147	0	13	2

All figures are rounded; see table Annex C for further details on the specific conflicts in this table.

Costs – risk of conflicts of interest arising

80. However conflicts related to the businesses within NGET are not avoided. These are as follows:

Table 10: Conflicts of interest resource costs (PV, £m, 2010 real)

Conflict	Description	Resource cost			NG Profits		
		Low	High	Best	Low	High	Best
2b(1)	2% higher margin (TO)[25]	0	170	25	0	1	Neg

Costs – compliance costs

81. There is a cost borne by energy consumers in implementing these mitigations, though this is likely to be zero to negligible, given the existing practice by National Grid, which already enforces separation around NGET and its other businesses. The costs may only include extending these measures to the new EMR functions. We have assumed these to be too small to be quantifiable but assumed to be zero for the purposes of this analysis.

Non-quantified benefits – Synergies retained

82. All the synergies identified in the baseline (and set out above and Annex F) are preserved within this ring-fence, as there are no synergies with the businesses outside of NGET.

[25] While there are other conflicts of interest with the electricity transmission business identified in our analysis, many of them overlap and so to avoid the risk of double-counting we have used the conflict of interest with the highest impact as the basis for the estimates of avoided conflicts with the transmission business. This approach is set out in more detail in Annex D.

Table 11: Synergies assessment – Option 2

Synergy (weighting)	Score	Qualitative explanation
Retains operational synergies (30%)	5	No separation so all synergies unaffected
Retains EMR outcome synergies (40%)	5	No separation so all synergies unaffected
Retains system synergies (30%)	5	No separation so all synergies unaffected
Weighted total	**5**	

Non-quantified impacts – investor confidence

83. Based on our engagement with stakeholders it appears that the perimeter of this ring-fence would be insufficient to address their concerns, as it does not address the perceived conflicts of interest with the System Operator. However it will address perceived issues with those businesses outside NGET, particularly the competitive businesses.

Overall summary and cost-benefit assessment

84. This option removes the risk of conflicts of interest arising with businesses outside NGET and therefore secures **benefits in terms of avoided conflicts** – although it is important to note that these conflicts of interest may never materialise so the benefits are uncertain. It does not involve significant **compliance costs**, as legal separation is already practised by National Grid.

Table 11: Cost-benefit analysis summary – Option 2

Category	Present Value (£m, 2010 real)		
	Low	High	Best estimate
Cost	0	0	0
Benefit	0	969	147
Net benefit	0	969	147

85. In terms of non-monetised impacts, it does not address issues of stakeholder confidence except where they relate to the competitive businesses. However it does retain the key **synergies** (outlined in section 3). We have therefore given these impacts the following scores in order to allow for a comparison of the non-monetised impacts across the options and test the monetised key cost-benefit analysis above.

Table 10: Objectives assessment – Option 2

Objective (weighting)	Scoring
Mitigation of conflicts (40%)	3
Stakeholder confidence (10%)	2
Synergies retained (25%)	5
Minimises costs (25%)	5
Weighted Total	3.75

Option 3: EMR and SO ring-fence

86. This option places a ring-fence around the SO. We have considered the two main categories of business separation under this option:

    - Functional separation – separation of IT, employees and physical location.
    - Legal separation – separation of the business into a legally separate company.

Benefits – Conflicts of interest avoided

87. Under this option, all the conflicts set out in Tables 2 and 3 are addressed and the biggest potential conflicts of interest (those associated with the electricity transmission business) are now separated by a ring-fence.

88. Table 3 shows resource costs[26] to society from each conflict and the total cumulative maximum resource cost, based on the KPMG assessment of the low probability range and best estimate[27] (). Under this option, these resource costs would be avoided and hence represents the benefit from avoided conflicts. The avoided resource costs and hence benefits are estimated to range between **£0-£1,140m** (with a best estimate of **£173m**).

89. It should also be noted that there are existing conflicts of interest that stakeholders have identified between the System Operator and Transmission Owner (as well as synergies). We have not analysed this in any detail given the scope of this work focussing on conflicts between the EMR functions and the SO's existing role; however they have the potential to be significant. They should therefore be considered a potential benefit of this option, as they could be mitigated by the imposition of this ring-fence.

Costs – costs of conflicts of interest

90. Conflicts of interest within the System Operator remain. However, KPMG was unable to quantify these so these are considered to be zero for the purposes of this cost-benefit analysis.

Costs – compliance costs

91. The compliance cost estimates for this option are based on analysis undertaken by Ofwat[28] on the costs of separation of retail water businesses. We have also consulted other sources; the full details of this work and these other sources are included in Annex E.

92. We estimate the full costs associated with separating the EMR function and SO (functional through to legal) are estimated to range from **£27m-£82m** for total set-up costs and around **£7m-£37m** per annum as ongoing costs. The total costs (set-up and ongoing) on a Present Value basis (2014-2030) would equate to **£117m-£550m**.

Non-quantified benefits – Synergies retained

93. This options retains the key synergies, but does have an impact in terms of existing synergies between the System Operator and Transmission Owner, which are currently integrated (see below).

[26] These represent the net effect from changes capital expenditure on generating assets, generation and carbon costs and capital expenditure on network assets relative to a base case scenario.
[27] See Annex C and D for more information on this approach
[28] http://www.ofwat.gov.uk/competition/review/pap_pos_090716threshold.pdf

Table 14: Synergies assessment – Option 3

Synergy	Score	Qualitative explanation
Retains operational synergies (30%)	5	Operational synergies unaffected
Retains EMR outcome synergies (40%)	4	Analysis synergies that relied on TO inputs, such shared modelling are lost or impaired.
Retains system synergies (30%)	4	Synergies that would allow for better planning by the TO are lost.
Weighted total	**4.3**	

Non-quantified costs – synergies lost

94. There are synergies that exist between the SO and TO which could be lost under this option, for example relating to constraint management. As with the conflicts of interest between SO and TO, we have not analysed this in any detail given the scope of the project; however they have the potential to be significant.

Non-quantified impacts – investor confidence

95. This should reduce stakeholder concerns about the conflicts of interest with most of National Grid's businesses; however the concern regarding the information asymmetry advantage for the SO in purchasing balancing services will remain.

Overall summary of option and cost-benefit assessment

96. This option removes the risk of conflicts of interest arising with businesses outside of NGET as well as conflicts within NGET (i.e. with the transmission business) and therefore secures **benefits in terms of avoided conflicts** – although it is important to note that these conflicts of interest may never materialise so the benefits are uncertain. The **compliance costs** for this option are high relative to the other options and this is important in the context of the uncertain benefits. To put these compliance costs into some context as a proportion of the benefits (where these are achieved and not zero) the costs would range between 10%-48% of the potential benefits.

Table 15: Cost-benefit analysis summary – Option 3

Category	Present Value (£m, 2010 real)		
	Low	High	Best estimate
Cost	117	550	334
Benefit	0	1,140	173
Net benefit	-550	1,023	-161

97. In terms of non-monetised impacts, this option loses **synergies** between the SO and TO but retains key synergies between the SO and EMR roles. While **stakeholder confidence** is to a certain extent addressed, consultation responses suggest that industry is most concerned with perceived conflicts of interest within the SO. We have therefore given these impacts the following scores in order to allow for a comparison of the non-monetised impacts across the options and test the overall monetised key cost-benefit analysis above.

Table 16: Objectives assessment – Option 3

Objective (weighting)	Scoring
Mitigation of conflicts (40%)	4
Stakeholder confidence (10%)	4
Synergies retained (25%)	5
Minimises costs (25%)	1
Weighted total	**3.5**

Option 4: EMR ring-fence – legal separation

98. This option places a ring-fence around the EMR functions, requiring that the EMR functions are carried out in a legally-separate subsidiary of NGET. The functions are therefore no longer integrated within the System Operator. We have also considered a sub-option of this - light-touch functional separation.

Benefits – conflicts of interest avoided

99. In this option all the conflicts as set out in Tables 2 and 3 have been addressed. This includes the remaining conflicts with the SO – though some of these could be considered synergies beneficial to consumers.

100. Table 3 shows the resource costs[29] to society from each conflict and the total cumulative resource cost, based on the KPMG assessment of the probability and impact of the conflict materialising[30]. Under this option, these resource costs would be avoided and hence represent benefits from avoided conflicts. The avoided resource costs and hence benefit is estimated to range between **£0-£1,140m**, with a best estimate of **£173m**.

Costs – compliance costs

101. We have carried out a bottom-up approach to estimate the compliance costs for this option, using our knowledge of how the EMR functions are being set up.

102. Based on discussions with National Grid and Ofgem, we estimate that additional resources would be required in terms of staff if the EMR delivery function were legally separated. Estimates of non-staffing costs are based on internal DECC estimates from the setup of schemes run by the Environment Agency i.e. Carbon Reduction Commitment (CRC)..

103. Legal separation should be easier to implement around the EMR team as it is currently being set up. This should make it less costly than option 3 (separation of SO from TO, which are currently fully integrated). The following table sets out the range of potential increase in cost to set up at each level of separation from the base case.

Table 17: Range of set up costs

Level of separation	Compliance costs, £m	
	Low	High
Information	0	3.6[31]
Employee	0	9[32]
Physical	0	5.3[33]
Legal/Financial	6.8	11.5[34]

104. In total, we therefore estimate one-off set up costs for separation to be within a range of **£0-£29m**. Ongoing costs would mostly consist of maintaining the salaries of the additional staff required by the separation[35].

105. Based on discussions with National Grid and experts within DECC, Table 18 below sets out the estimated staff costs. In the base case where the EMR functions are integrated within the SO, there are 33 additional staff across grades when integrated, whereas under legal separation a total of 75 staff are estimated to be required.

[29] These represent the net effect from changes capital expenditure on generating assets, generation and carbon costs and capital expenditure on network assets relative to a base case scenario.
[30] see Annex C and D for more information on this approach
[31] CRC budget business case
[32] Maximum cost includes cost of recruitment across grades and setting up a separate remuneration scheme. This estimate is based on discussions with Ofcom, Ofgem, KPMG and stakeholders in the energy and telecoms sectors.
[33] Observations of current market costs for commercial properties and required set up
[34] Range based on discussions with NG, Ofgem and other cost assumptions in the table.
[35] This could also be considered the value of synergies lost

Table 18: Comparison of staff costs

Annual costs: integrated (£m)	Annual costs: EMR legal separation (£m)
5.3	12.2

106. The next table estimates more general costs, such as total staff (as per Table 17 above), IT, and facilities based on internal DECC estimates derived from set up of schemes delivered by the Environment Agency. The difference between the total for EMR being integrated and legally separated is around £8m per annum.

Table 19: Ongoing costs

Item	Additional ongoing costs: EMR legal separation (£m)
IT system[36]	0.65
Premises[37]	0.38
Staff	6.8
Total	**7.9**

107. The total costs of this option (set-up and ongoing) on a Present Value basis (over the period 2014-2030) are estimated to range between **£98m-£119m**[38].

108. The costs set out above cover a broad range. We have also costed a 'light functional separation' option below. Some specific example of costs would be due to the following.

- IT access rights restrictions – these would limit access to EMR data to only those with appropriate authorisation.
- Employee separation compliance – these would use the practices NG already has in its business and use them for EMR. This could include:
  - a cooling-off period when employees transfer between posts inside EMR and outside (NG already require it between certain posts, such as those in NGET and Offshore)
  - Confidentiality agreements placing conditions on staff to safeguard information and could result in disciplinary action for breach.
- A secure office area – this would likely involve partitioning off an area of National Grid offices and installing doors (for the purposes of this IA we have assumed two which appears reasonable given the number of staff) with a swipe card or fob locking system to limit access to EMR staff only.

109. In this option we have assumed 5-15 additional staff would be required from the base case of 33. The likely range of staff costs based on National Grid Full Time Employee (FTE) costs are **£0.8m-£2.5m**[39] per annum. Table 20 below sets out the cost range of additional staff.

Table 20: Staff Costs – light functional separation

Grade	PA FTE[40] (£000s)	PA Staff costs, £m	
		Low	High
D	163	0.16	0.65
Support[41]	154	0.62	1.8
Total costs		0.78	2.5

[36] Based on assumption of 18% of informational set-up costs as per proceeding table based on DECC estimates from the set up of schemes run by the Environment agency.
[37] Rent assumption of £5000 per full time employee based on DECC estimates from the set up of schemes run by the Environment agency.
[38] In 2010 prices
[39] Assuming 12 support staff and 3 grade D staff
[40] FTE costs from National Grid budget for EMR delivery
[41] We have used FTE costs for level 8 staff.

110. For the following cost assumptions, we have used the mid-point on the range of additional staff (i.e. 10 FTE). These estimates represent set-up costs; we do not believe there will be additional ongoing costs other than staff salaries.

Table 21: Set-up costs – light functional separation

Item	Cost, £
Partitioning office[42]	47,000[43]
Secure swipe card access[44]	1,600
IT	0[45]
Employee compliance costs	0[46]
Recruitment of additional staff	0[47]
Total	**48,600**

111. On this basis therefore, one-off set-up costs of light functional separation could range between £0-£0.049m with on-going costs ranging from **£0.78m-£2.5m**. Total costs on a PV basis (2014-2030) are estimated to be around **£9.1m- £29m** (2010 prices).

Non-quantified costs – lost synergies

112. Most of the synergies between the System Operator and EMR roles would be lost under this option. Information that the SO currently holds used for the delivery of EMR could still flow from the SO to the EMR entity, so this would preserve some synergies; the rest would largely be lost.

Table 22: Synergies assessment – Option 4[48]

	Legal Separation		Light Functional Separation	
Synergy	**Score**	**Qualitative explanation**	**Score**	**Qualitative explanation**
Retains operational synergies (30%)	2	Operational synergies lost with SO. Still retains advantages of common legal, HR, IT etc services.	3	Many of the operational synergies are retained.
Retains EMR outcome synergies (40%)	2	Analysis synergies severely impaired, some information inputs but no expertise could flow.	3	Analysis synergies impaired, information inputs and some expertise could flow.
Retains system synergies (30%)	1	Synergies that would allow for better planning, and reductions in balancing costs by the SO are lost	2	Majority of synergies that would allow for better planning by the SO are lost
Weighted total	**1.7**		**2.7**	

113. The exact nature of the functional unbundling under this option means that some synergies could be retained. The light functional separation illustrates this difference – for example, employees would be able to move relatively easily between the ring-fenced EMR functions and the SO functions; and they would be operating under common management. This would allow the flow of experience and knowledge to be retained.

Non-quantified impacts – investor confidence

114. The greatest benefit of this option is that it should alleviate the concerns of industry, giving greater comfort to investors, and comfort to stakeholders on the treatment of information they submit.

[42] This is based competitive quotes for 240m of partition required to partition an office area of 160m^2 on 3 sides. We have assumed a ceiling height of 3m and used HSE minimum office space requirements per person 3.7m^2 .
[43] [43] Estimate based on solid wall partition costing £190 per meter and doors costing £700 each.
[44] Based on competitive quotes for 2 doors.
[45] IT access rights are part of business as usual for NG
[46] NG already has business separation compliance, including gardening leave between posts. So these measures would form part of the business as usual.
[47] NG will be recruiting for staff to fulfil the EMR roles, The additional staff for this separation would be recruited as part of that process.
[48] Assumes a severe level of functional or legal unbundling

Overall summary of option and cost-benefits assessment

115. This option removes the risk of conflicts of interest arising with National Grid businesses and therefore secures **benefits in terms of avoided conflicts** – although it is important to note that these conflicts of interest may never materialise so the benefits are uncertain. It could also be argued that the lighter the separation, the less effective the ring-fence would be.

116. The **compliance costs** for this option are lower than for option 3. To put these compliance costs into some context as a proportion of the benefits (where these are achieved and not zero) the costs would be around 9%-10% of the potential benefits. However, the costs associated with lighter functional separation are comparatively lower, representing up to 2.5% of the potential benefits.

Table 23: Cost-benefit analysis summary – Option 4

Category	Present Value (£m, 2010 real)					
	Legal separation			Light functional separation		
	Low	High	Best	Low	High	Best
Cost	98	119	109	9.1	29	19
Benefit	0	1,140	173	0	1,140	173
Net benefit	-119	1,040	64	-29	1,131	154

117. In terms of non-monetised impacts, this option loses **synergies** between the SO and EMR roles, though some of these are retained in the case of functional unbundling. **Stakeholder confidence** is fully addressed under this option. We have therefore given these impacts the following scores in order to allow for a comparison of the non-monetised impacts across the options and test the overall monetised key cost-benefit analysis above.

Table 24: Objectives assessment – Option 4

Objective (weighting)	Scoring	
	Legal separation	Light functional separation
Mitigation of conflicts (40%)	5	4
Stakeholder confidence (10%)	5	4
Synergies retained (25%)	1	3
Minimises costs (25%)	3	3
Weighted Total	**3.5**	**3.5**

Option 5 (Preferred Option): EMR ringfence – hybrid option

118. This option would separate ***some*** of the EMR functions within NGET. The administrative EMR delivery functions (CfD allocation and running CM pre-qualification/auctions) would be ring-fenced to the level of functional unbundling (IT/employee/physical) while the analytical function would be integrated within the SO. This retains the most material synergies, which relate to combining the EMR analytical functions with the System Operator's existing analytical functions.

119. However, in order to minimise the risk of conflicts arising where there is no ring-fence, the **NGET director responsible for the EMR analysis** would be required to ensure that the EMR analysis is not unduly influenced by NGET's other activities. In addition, in order to address stakeholder concerns about confidential information submitted to EMR analysts (in the absence of a ring-fence around the EMR analytical functions), we would implement a **data handling facility within the SO** that would aggregate and anonymise the data before it is used in developing the EMR analysis.

Benefits – conflicts of interest avoided

120. In this option if we assume that ring-fencing and the duty on the EMR director is fully effective, then all the conflicts as set out in Tables 2 and 3 would be addressed. This includes the remaining conflicts with the SO. However, it could be argued that this option may be less effective at mitigating conflicts than full legal separation of EMR functions (Option 4). We have not taken this into account within the cost-benefit analysis, given the difficulties of assigning a monetary value to difference in effectiveness which is difficult to define, but have considered it in the qualitative assessment of the option below (i.e. it does not score as highly as legal unbundling of the EMR functions).

Costs – compliance costs

121. We have carried out a bottom-up approach to estimate the compliance costs for this option, using our knowledge of how the EMR functions are being set up. This separation we have assumed will cost less than legal separation of EMR or the SO, and approximately equal to that proposed in option 4 (light functional unbundling). Where in option 4 additional staff resource would be required to provide the EMR analysis (since this is separated under Option 4), this additional resource may be required for the data handling team.

122. The separation in this option should be easier to implement, as EMR is being currently set up. In this option we have assumed 5-15 additional staff would be required from the base case of 33. The likely range of staff costs based on National Grid Full Time Employee (FTE) costs are **£0.78m-£2.5m** per annum (PA). The below table sets out the cost range of additional staff.

Table 25: Staff Costs – Option 5

Grade	PA FTE[49] (£000s)	PA Staff costs, £m	
		Low	High
Range D[50]	163	0.16	0.65
Support[51]	154	0.62	1.8
Total costs		0.78	2.5

123. For the following cost assumptions we have used the midpoint on the range of additional staff (i.e. 10 FTE). These estimates identify set up costs as other than staff salaries we do not believe there will be other ongoing costs.

Table 26: Set-up costs – light functional separation

Item	Cost, £
Partitioning office[52]	47,000[53]

[49] FTE costs from National Grid budget for EMR delivery
[50] Managerial-type roles
[51] We have used FTE costs for level 8 staff.
[52] This is based competitive quotes for 240m of partition required to partition an office area of 160m^2 on 3 sides. We have assumed a ceiling height of 3m and used HSE minimum office space requirements per person 3.7m^2.
[53] [53] Estimate based on solid wall partition costing £190 per meter and doors costing £700 each.

Secure swipe card access[54]	1,600
IT	0[55]
Employee compliance costs	0[56]
Recruitment of additional staff	0[57]
Total	**48,600**

124. On this basis therefore one-off set up costs of functional separation could range between **£0-£0.049m** with ongoing costs ranging from **£0.78m-£2.5m**. Total costs on a PV basis (2014-2030) are therefore estimated to be around **£9.1m- £29m[58].**

Non-quantified benefits – Synergies retained

125. The key synergies with the analytical function are retained – specifically that good quality analysis resulting from integrating the analytical functions leads to more efficient CfD strike price setting and a more efficient level of capacity to contract for. As the KPMG analysis makes clear, these synergies have the potential to be significant.

Non-quantified costs – lost synergies

126. As with lighter functional unbundling under option 4, the synergies relating to the 'administrative' functions (i.e. allocation of CfDs and Capacity Market auctions) are to some extent lost. However we expect these synergies to be realised before the ring-fence is put in place, therefore reducing such synergy losses. Furthermore, we would expect the flow of employees to be relatively straightforward, which should allow for synergies from existing experience and expertise within the SO to be realised.

Table 27: Synergies assessment – Option 5

Synergy	Score	Qualitative explanation
Retains operational synergies (30%)	3	Many of the operational synergies are retained.
Retains EMR outcome synergies (40%)	4	Synergies between EMR analytical functions and SO functions are retained.
Retains system synergies (30%)	3	Majority of synergies that would allow for better planning by the SO are retained
Weighted total	**3.4**	

Non-quantified impacts – investor confidence

127. As with option 4, this should alleviate the concerns of industry, giving greater comfort to investors. While the analytical function is integrated, we would expect the data handling facility to address their concerns regarding the treatment of information they submit.

128. The data handling team envisaged in this option also provides wider benefits beyond any potential conflict of interest that handling stakeholder data might give rise to. Several industry stakeholders have raised concerns about handing over commercially sensitive data to a private company like NG, whether or not there exists any potential conflicts of interest.

Overall summary of option and cost-benefit assessment

129. This option removes the risk of conflicts of interest arising with National Grid businesses and therefore secures **benefits in terms of avoided conflicts** – although it is important to note that these conflicts of interest may never materialise so the benefits are uncertain. The **compliance costs** for this option are relatively low. To put these compliance costs into some context as a

[54] Based on competitive quotes for 2 doors.
[55] IT access rights are part of business as usual for NG
[56] NG already has business separation compliance, including gardening leave between posts. So these measures would form part of the business as usual.
[57] NG will be recruiting for staff to fulfil the EMR roles, the additional staff for this separation would be recruited as part of that process.
[58] 2010 prices

proportion of the benefits (where these are achieved and not zero) the costs would be up to 2.5% of the potential benefits.

Table 26: Cost-benefit analysis summary – Option 5

Category	Present Value (£m, 2010 real)		
	Low	High	Best estimate
Cost	9.1	29	19
Benefit	0	1,140	173
Net benefit	-29	1,131	154

130. In terms of non-monetised impacts, this option **retains the key synergies** relating to the integrated analysis but loses some other **synergies** relating to the EMR 'administrative' functions. From the analysis this package of measures should fully address **stakeholder confidence** through the data handling team and separation of the administrative functions. We have therefore given these impacts the following scores in order to allow for a comparison of the non-monetised impacts across the options and test the overall monetised key cost-benefit analysis above.

Table 25: Objectives assessment – Option 5

Objective (weighting)	Scoring
Mitigation of conflicts (40%)	4
Stakeholder confidence (10%)	4
Synergies retained (25%)	4
Minimises costs (25%)	4
Weighted Total	4

Overall justification of the preferred option

131. Each option presented in this Impact Assessment has costs and benefits relating to its ability to minimise the risk of conflicts of interest arising, the impact on synergies between National Grid's existing role and new EMR role, the effect on stakeholder confidence in EMR, and the costs to National Grid (and ultimately to consumers) of complying with any business separation requirements.

132. Our choice of preferred option is based on the costs and benefits of the key monetised impacts – minimising the risks of conflicts arising and compliance costs of implementing the separation measures (which will ultimately be borne by consumers) – and the results are presented below. This clearly shows that option 5 should be preferred.

Table 27: Cost-benefit analysis summary

Option	Costs			Benefits			NPV		
	Low	High	Best estimate	Low	High	Best estimate	Low	High	Best estimate
1	0	1,140	173	0			-1,140	0	-173
2	0			0	969	147	0	969	147
3	117	550	334	0	1,140	173	-550	1,023	-161
4	9.1	119	64	0	1,140	173	-119	1,131	109
5	9.1	29	19	0	1,140	173	-29	1,131	154

133. However in recognising that there are other impacts which we were not able to monetise, we have produced a multi-criteria analysis to test the cost-benefit analysis above. Option 5 is also preferred under the qualitative assessment. While it could be argued that it does not provide quite the same protection against conflicts of interest as legal separation of the EMR functions would provide – and nor therefore does it fully address stakeholder confidence – it does preserve most of the synergies (which will lead to overall savings for consumers) – and it can be implemented at relatively low cost.

Table 28: Comparison of how each option meets policy objectives

Objective (weighting)	Option 1	Option 2	Option 3	Option 4	Option 4: Functional	Option 5: Preferred option
Mitigation of conflicts (40%)	1	3	4	5	4	4
Stakeholder confidence (10%)	1	2	4	5	4	4
Synergies retained (25%)	5	5	5	1	3	4
Minimises costs (25%)	5	5	1	3	3	4
Weighted Total (out of 20)	**3**	**3.75**	**3.5**	**3.5**	**3.5**	**4**

Wider Impacts

Human Rights impacts

134. We consider that the powers we are seeking in the Energy Bill 2013 to put in place business separation measures to address conflicts of interest arising as a result of the System Operator carrying out the EMR delivery role can be exercised in a way which is compatible with the Human Rights Act 1998

Impact on Micro Businesses

135. It is unlikely that micro businesses will be affected since the measures only affect National Grid, though, like other energy consumers, they will ultimately bear the compliance costs set out in the Impact Assessment.

Annex A: Background on National Grid

136. National Grid Electricity Transmission (NGET) is a private company that is the integrated electricity System Operator (SO) and the England and Wales Transmission Owner (TO), both activities for which it is licensed by the regulator Ofgem. The overarching duty of NGET as the transmission licensee is to develop and maintain an efficient, co-ordinated and economical system of electricity transmission.

137. The SO coordinates the flow of electricity across the electricity system and the TO owns and builds the assets (and consequently the latter forms the significant part of NGET's revenues and profits).

138. NGET is part of a wider group National Grid plc, the largest energy infrastructure company in the UK. Its business is roughly divided in equal parts between electricity (primarily NGET) and gas (mainly related to gas transmission and distribution). National Grid has a UK regulated asset base worth £22bn[59] which incorporates the following regulated businesses, in addition to NGET's electricity transmission assets:

- Great Britain Gas System Operator
- The gas National Transmission System
- 4 of the 8 gas distribution networks
- Gas metering

139. It also has several businesses in competitive markets:

- Interconnectors – National Grid is a 50% owner in two of the undersea cables that connect the transmission network to the continent.
- Offshore electricity transmission – this business competes in tenders for licences to run areas of the offshore transmission network in a competitive process run by the regulator Ofgem
- A Liquid Natural Gas (LNG) import terminal
- Carbon Capture and Storage (CCS) – National Grid is part of a consortium which is a preferred bidder in the Government CCS competition. National Grid will provide the transportation aspect of CCS.

140. National Grid already operates under a number of controls within the existing regulatory regime to address existing conflicts of interest, for example:

- Special Condition C1 (SC C1) of NGET's transmission licence which requires that NGET conducts its transmission business in a way that does not confer an unfair commercial advantage on itself or any affiliate or related undertaking.

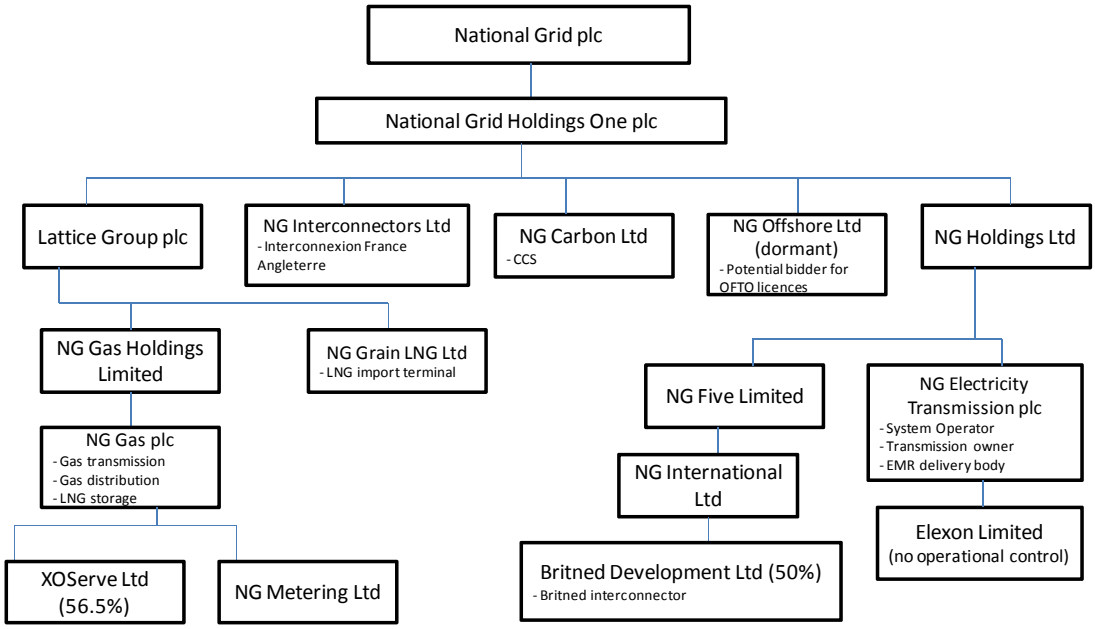
- Special Condition C2 (SC C2) of NGET's transmission licence requires that NGET puts in place systems of control and governance arrangements to ensure compliance with SC C1 and to have in place a compliance statement. For offshore transmission, SC C2 specifies what systems of control and governance need to be set out in that statement.

- Section 105 of the Utilities Act 2000 requires that information obtained under specified acts (including, for example, the Electricity Act 1989) that relates to the affairs of an individual or a particular business cannot be disclosed during the lifetime of the individual or while the business is being carried on. This is subject to various exceptions.

141. The corporate structure of National Grid in the UK is set out in Figure A1 below and shows the legal subsidiaries within National Grid. It shows that the Gas operations are in a different group to electricity and that each non-regulated business sits within its own legally distinct business.

[59] National Grid investor factsheet (http://www.nationalgrid.com/corporate/Investor+Relations/Factsheets/)

Figure A1: National Grid's UK group structure



Based on National Grid plc corporate structure at 30/9/2011.
This chart shows the principal UK operating companies and excludes a number of National Grid PLC's businesses including: finance, overseas, property, etc
NG = National Grid

Source: National Grid

Annex B: Business Separation

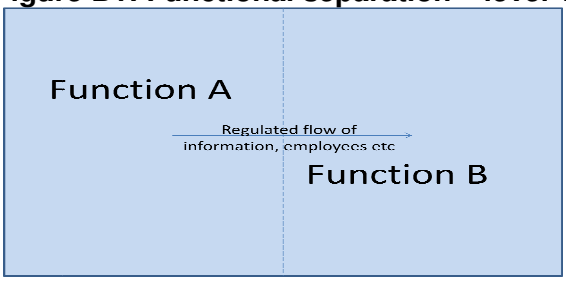
142. Business separation is used in many sectors to help businesses avoid conflicts of interest or abusing dominant market positions. Business separation is a tool that has been used in the energy, telecoms, and other sectors.

143. Business separation initially means creating a barrier between two functions within a single business unit. Examples of different levels of separation are shown in the figures below, with more detailed separation measures specific to the EMR delivery functions in the table afterwards.

Functional separation

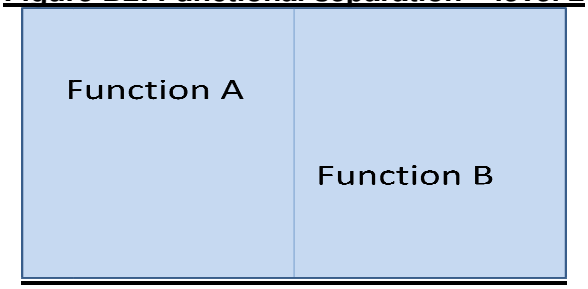
144. Once the need for some business separation has been established, it is often introduced at a functional level first. This will see controls imposed on how information is used and shared, and how employees can move around the business. The functions still exist within the same business unit.

Figure B1: Functional separation – level 1



145. The next level is to place a stronger ring-fence within the business unit, no longer allowing information to flow or staff to interact, but still having the same corporate leadership and governance.

Figure B2: Functional separation – level 2



Full legal separation

146. The final step in business separation is to legally unbundle the business unit, creating two entirely separate business units to house each of the functions formerly undertaken by the original unit.

Figure B3: Full legal separation

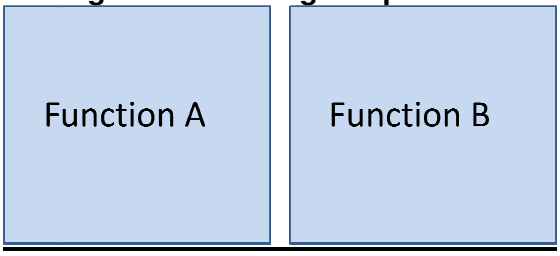


Table B1: Illustrative table of business separation that could apply to the EMR function

Functional unbundling	**Information separation**	Restrictions on access to confidential information and computer systems • Creating different access rights for EMR data* • Placing all EMR data on a separate server. • Building an IT system for EMR entirely detached
	Separation of employees and staff	Staff do not work both inside and outside the ring-fenced function • EMR staff only work on EMR. • EMR staff sign confidentiality agreements, other alteration to terms of work, contracts, etc • EMR staff remuneration tied to EMR objectives. • strict requirements affecting the transfer of employees from one business to another such as 3 month cooling off periods • appointment and duties of a compliance monitor may ensure appropriate separation of staff as well as provide accountability for other separation measures • Entirely separate remuneration scheme for EMR staff.
	Physical separation	Staff are not working amongst other NG staff outside the ringfence • Rearranging an office so EMR staff sit separately • Partitioning offices • Placing EMR team in a secure work area (swipe card door etc) • Placing EMR in a separate premises
	Financial separation and additional financial obligations[60]	Separate financial arrangement for the ringfence function • separate auditing and reporting of accounts • separation of revenues and prohibition of cross-subsidy • requirement not to hold or acquire shares or investments in other relevant business
Legal unbundling	**Legal separation and additional obligations**	• a requirement for directors to fulfil their roles as a director of a separate company whose sole business is the business in respect of which the legal board of which he is a member has been established • a requirement for the licensee to procure from each company which is at any time an ultimate controller of the licensee a legally enforceable undertaking in that the ultimate controller will refrain from any action which would then be likely to cause the licensee to breach any of its obligations under relevant legislation or under the relevant licence. This condition attempts to deter ultimate controllers from directing different businesses such that they benefit unfairly • a requirement to act in an economic and efficient way, and not to discriminate against or in favour of other parties (Licence conditions, Electricity Act 1989/ Gas Act 1986)

[60] Financial separation has been included in functional unbundling for completeness. It is not considered one of the functional unbundling levels in any of the options below that go into specific detail on functional unbundling, particularly options 4a, 4b and 5.

Annex C: Risk analysis of conflicts of interest arising (KPMG analysis)

147. We set out the potential for conflicts of interest to materialise in our consultation, issued in November 2012[61]. In responses to the call for evidence, stakeholders broadly confirmed the range of conflicts of interest that were set out in the call for evidence document.

148. In order to understand the materiality of these conflicts of interest, we commissioned independent consultants KPMG to assess them in order that we could analyse the problem. In assessing the materiality of the potential conflicts of interest, KPMG considered two aspects:

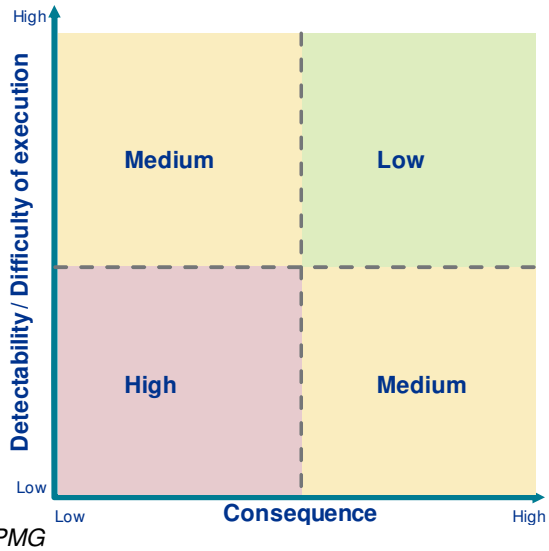
- The probability of National Grid acting on a potential conflict, taking into account:
  - Ease of execution, given the type of conflict and design of the relevant EMR elements, and given the presence of existing deterrents from acting on conflicts (e.g. legal restrictions, licence conditions, other regulatory restrictions)
  - The detectability of National Grid's actions if it were to act on a potential conflict; and
  - The consequences if National Grid businesses are found acting on a potential conflict
- The impact of potential conflict based on the potential profitability for the National Grid business(es) involved and/or for National Grid PLC.

149. DECC was also able to use the underlying data from this analysis to assess the costs to society from these conflicts of interest, were they to arise. The main findings of the KPMG work and DECC's further analysis are set out below.

Assessment of the probability of National Grid acting on a potential conflict of interest

150. To derive the probability of conflicts of interest arising, KPMG considered what residual capability National Grid might have to exploit conflicts (executibility), how easily Government, the regulator or stakeholder would notice what National Grid was doing (detectability), and what consequences National Grid would face if caught. The below graph demonstrates how KPMG assessed each conflict of interest.

Figure C1: Assessment criteria for determining probability



Source: KPMG

151. Having considered these issues, KPMG concluded that overall the likelihood of National Grid acting on all identified conflicts of interest is low. More detail on their analysis can be found in the report published alongside this IA. It is also summarised in Table C1 below.

152. KPMG did not attempt to put specific values on the probability of these conflicts arising. However, in order to carry out a cost-benefit analysis for this Impact Assessment, we have used a 'low'

[61] https://www.gov.uk/government/consultations/synergies-and-conflicts-of-interest-arising-from-the-system-operator-delivering-electricity-market-reform-emr

probability range of 0% to 33%. In terms of a best estimate, KPMG suggested that we utilise the way probability is assessed in the financial markets, particularly for 'Value at Risk'-type analysis, which is a widely-used measure of the risk of loss on a specific portfolio of financial assets. Under such an approach, a 'low' probability is generally set at 5%[62].

153. For the purposes of this Impact Assessment, we have considered both the full range for 'low' probability (i.e. 0%-33%) and also applied a 'best estimate' probability rating of 5% to the estimates of resource costs (set out below in Table C2).

Assessment of the financial impact on National Grid if it were it to exploit conflicts of interest

154. KPMG also considered the financial impact on National Grid's profits as a consequence of acting on any conflict. The assessment was based on a series of tests developed by KPMG and modelled by Pace Global (a Siemens Business) using an electricity sector dispatch model[63] based on DECC, Ofgem and publicly available data

155. Overall, the KPMG analysis suggests that the profits to National Grid from exploiting conflicts of interest are potentially relatively low. The potential total additional profits for National Grid from acting on the conflicts of interest are around **£50m-£70m** (on a Net Present Value basis between now and 2030)[64]. This is very low, compared with National Grid's UK annual operating profit of approximately £2.3bn (in 2011/12[65]). On this basis, the incentive for National Grid to exploit conflicts of interest seems low, given the high potential risks and comparatively low potential rewards.

156. Table C1 below presents a summary of the probability and impact of each conflict of interest.

Table C1: Conflicts of Interest[66]

Category	Conflict ID	Conflict of interest	Probability	Impact (NPV until 2030)[67]
Information	1A	Advance knowledge of potential generating sites allows TO to acquire land and subsequently sell it at a profit	Zero	N/A
	1B	Access to business-privileged information on likely future gas build benefits National Grid electricity and gas network businesses. Information may give National Grid TO businesses an advantage in CAPEX baselining process under RIIO[68]	Low	£0
	1C	National Grid Offshore Transmission business has access to offshore capacity procurement information that can give it a first mover advantage	Low	£8m
	1D	NG interconnector business can benefit from early access to EMR information (CM, CfD), providing National Grid with price volatility information	Low	£0 for new IC; £2m for existing IC
	1E	National Grid CCS business benefits from advance information when taking part in CfD analysis and	Medium	£<0.2m

[62] Value at Risk (VAR) calculates the maximum loss expected (or worst case scenario) on an investment, over a given time period and given a specified degree of confidence (typically at the 95% confidence level, hence 5% or lower is deemed low risk).
[63] Pace used AURORAxmp, a commercial despatch model developed by EPIS inc, and used extensively in the US and Europe by the Energy sector.
[64] The NPV profit figures are taken directly from the KPMG report where the discount rate was based on National Grid Weighted Average Cost of Capital, and Return on Equity assumptions
[65] Figures from National Grid provided by Ofgem
[66] Those given an N/A impact are where it was; so unlikely NG could act upon the conflict that it was not a proportionate use of KPMG time to model the impacts, the impact were so low as to be negligible, or it there was not appropriate evidence on which to base the modelling and it was not proportionate use of resources to gather it.
[67] As per footnote 2
[68] Refer to RIIO

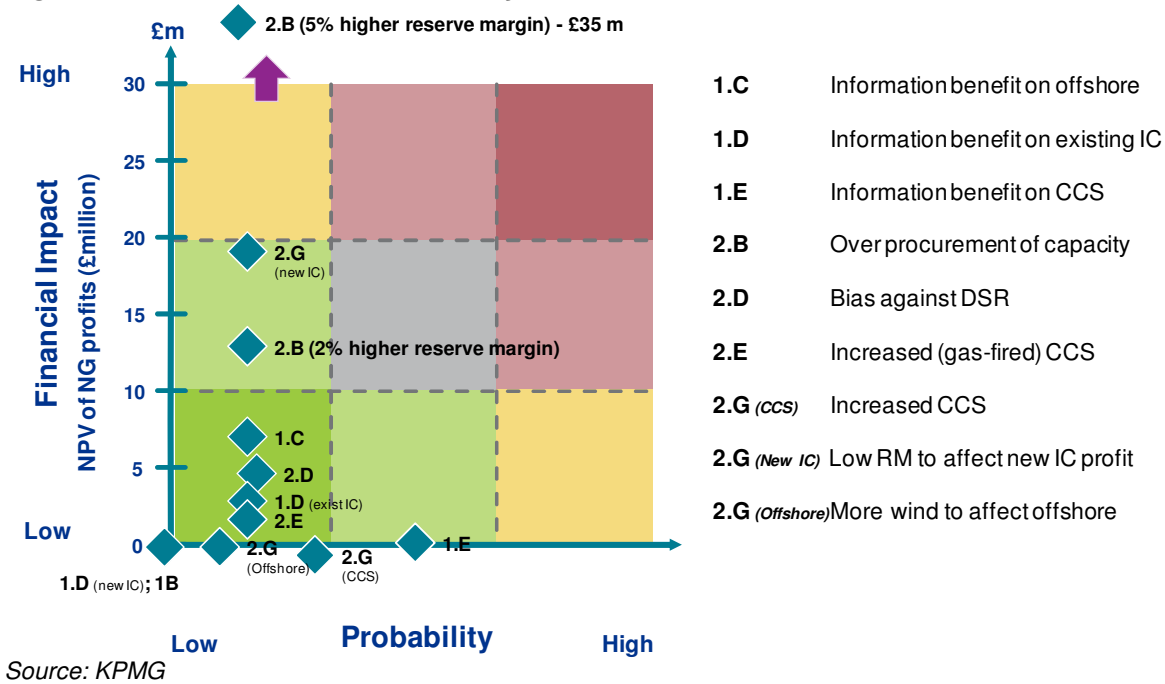
		allocation process and capacity market administration run by SO		
	1F	National Grid's Gas LNG business may benefit from advance information on the potential future demand for gas, given likely EMR outcomes (e.g. CfD strike prices)	Low	N/A
Influence and Discretion	2A	Influence or discretion by EMR team to over-procure capacity (CM) or favour a flexible generation mix (CM, CfD) to facilitate meeting licence obligations (e.g. balancing the system)	Low	N/A
	2B(1)	Influence or discretion by EMR team to over-procure capacity for the benefit of National Grid's electricity and gas TO (analysis examined a 2% higher capacity margin)	Low	£14m-£35m
	2B(2)	Influence or discretion by EMR team to lower notional efficient TO costs under RIIO	Low	N/A
	2B(3)	Influence or discretion by National Grid EMR team to locate CfD and CM capacity in England and Wales rather than Scotland	Low	N/A
	2C	Influence or discretion by EMR team to favour technologies that offer better opportunities for TO profits	Low	N/A
	2D	Influence or discretion by National Grid's EMR team to favour generation solutions over Demand-Side Response (DSR) to benefit TO	Medium (moving to low)	£5m
	2E	Influence or discretion by EMR team to benefit National Grid's gas businesses (storage, TO, SO) through over-procurement of capacity or encouraging focus on gas-fired generation	Low	£2m
	2F	Influence to raise the cost of capital used in EMR analyses to benefit regulated businesses	Zero	N/A
	2G	Influence or discretion by the EMR team to place weight on technologies to favour particular new or existing business (CCS/IC/Offshore) in CM or CfD instruments	Low	£<0.1 (CCS) to £20m (IC)

157. For conflicts 2E and 2B(1), KPMG's analysis of conflicts focuses on those relating to new network build due to new gas plant being built. However as part of the conflicts assessment KPMG also considered conflicts that relate to extending the asset life of the network due to gas plant not being retired but staying online[69]. In consultation with Ofgem, KPMG agreed that the assessment of this potential conflict is essentially covered under new build, as given by 2E and 2B(1). New build should result in a higher pipeline capex requirement than extending the life of the pipeline to service the life of an existing plant that is kept open. The actions required by National Grid to execute the conflict between new build and maintaining an existing plant connected to the network system are similar/identical, however new build would provide the higher income stream (on a like-for-like basis).Therefore, KPMG worked from the basis of new build as this would cause the greatest cost and thus a more conservative estimate of the potential resource costs.

158. In setting out the materiality of these different conflicts, KPMG used a graph like the one below, setting out the financial impact compared with the probability of the risk materialising. Therefore, the more material the conflict of interest, the further to the top right it would appear.

[69]DECC also posed the question if National Grid gets revenues for its existing regulated asset base (which has a regulated asset value - RAV) for gas on a volume metric basis will more gas also allow it more revenue? It has been confirmed that NG revenues are not volume dependent in this way and so this is already mitigated by the way the regulatory regime provides for the return on the RAV.

Figure C2: Assessment of Materiality



Source: KPMG

Assessment of wider resource costs if conflicts of interest were exploited by National Grid

159. While the KPMG analysis suggests that the profits to National Grid and likelihood of it acting upon the conflicts are relatively low, we also consider the costs to society if National Grid did exploit these conflicts of interest.

160. Table C2 below shows the adjusted resource costs[70] which reflect the welfare losses to society from the inefficiencies that would arise if National Grid acted on identified conflicts. Estimates of National Grid's profit[71] are also provided in the table and show the likely gains to National Grid from acting on these conflicts. The figures reflect the low probability range (0%-33%, as discussed above) and the best estimate, based on a 5% probability.

Table C2: Resource costs and National Grid profits from conflicts of interest

Conflict	Description	Resource cost (PV, £m, 2010 real)			National Grid profits (PV, £m, 2010 real)		
		Low	High	Best	Low	High	Best
1c	Offshore TO first mover	-	-	-	0	4.7	0.55
1d	Interconnector revenue	-	-	-	0	1.2	0.16
1E	CCS advance info	-	-	-	Negligible		
2b(1)	2% higher margin	0	648	98	0	6.4	0.96
2d	More gen rather than DSR	0	490	74	0	2.1	0.32
2E	More gas favours NG gas business	0	462.5	70	0	0.9	0.13
2G	more CCS	0	429	65	Negligible		
	More IC	0	0.03	Neg	0	7.6	0.99
	More wind	0	62.5	9	0	0.4	Neg

*Figures are rounded

161. Table C2 shows that, while the risk of conflicts of interest arising is small, the resource costs have potential to be significant.

[70] Resource costs relate to the capex costs of new network and generation capacity, in addition to the generation and carbon costs associated when operating the generation capacity relative to a base case scenario.

[71] National Grid earns a profits based on the network capex aspect of the resource costs and for conflicts where there it gains increased market share there is no additional resource spend but profits from that increase in market shares relating to existing commercial businesses. These profits therefore represent a distributional transfer between consumers and National Grid. The generation and carbon components of resource costs are recovered from consumers by energy suppliers through market operation and associated profits, these are outside the scope of this analysis.

162. KPMG assessed each conflict individually and some of these may not occur simultaneously and hence would not be considered to be additive. For example, three conflicts of interest (2b(1), 2d, 2E) relate to procurement of capacity; as such, they are sub-sets of the overall potential conflict of interest relating to over-procurement of capacity. The resource costs from these scenarios would not be simultaneously realised, and so the resource costs would be double-counted if added together. We consider the interdependencies between the conflicts of interest in Annex D.

Conclusions

163. The analysis set out above shows that:

- The probability of National Grid acting on a conflict of interest is low
- The financial impact in terms of National Grid's profitability is low (particularly when considered in the context of National Grid's overall profits)
- The resource costs to society if the conflicts of interest are realised have the potential to be significant
- There are significant stakeholder concerns about the potential for conflicts of interest to arise that may impact on the delivery of key EMR outcomes

Annex D: Monetised costs & benefits – Cost of conflicts of interest arising/Benefit of conflicts avoided

164. The cost of conflicts of interest arising relates to the costs that society would have to bear. For example if National Grid manipulated its position as the EMR delivery body to advise for more generation to be built than was necessary, National Grid would profit from building more transmission lines, but society however would have to pay for the additional lines and power stations through their energy bills.

165. We have used the KPMG analysis set out in Annex C to assess these conflicts in terms of their costs (where the risk of conflicts of interest arising are potentially not addressed i.e. the do nothing option, Option 1) or their benefits (where a proposed option addresses the risk of conflicts of interest arising).

166. As set out earlier, KPMG used a probability rating of each conflict arising, which we have used to estimate the total potential resource cost resulting from a conflict of interest. Most conflicts fall into the 'low' probability category (i.e. 0-33% probability), with a recommended best estimate of 5%, as used in 'Value at Risk' financial analysis to denote low probability[72]. It is important to note that these conflicts may never arise and, as such, the cost and benefits are subject to inherent uncertainty.

167. We have also considered that the conflicts of interest will not in all cases arise simultaneously. The table below considers the interdependency between conflicts and highlights the conflicts that occur simultaneously and the ones that will not.

Table D1: Resource costs and National Grid profits from conflicts of interest arising simultaneously

Conflict	Description	Resource cost (PV, £m, 2010 real)[73]			National Grid profits (PV, £m, 2010 real)			Conflict interdependency
		Low	High	Best	Low	High	Best	
1c	Offshore TO first mover	-	-	-	0	4.7	0.55	*Can occur in isolation and with others*
1d	Interconnector revenue	-	-	-	0	1	0.16	*Can occur in isolation and with others*
1E	CCS advance info	-	-	-	Negligible			*Can occur in isolation and with others*
2b(1)	2% higher margin	0	648	98	0	6	0.96	*Can occur in isolation and with others except 2d, 2E, and 2G. All other overprocurement is a subset of this conflict.*
2d	More gen rather than DSR	0	490	74	0	2	0.32	*Can occur in isolation and with others except 2b(1), 2d*
2E	More gas favours NG gas business	0	462	70	0	0.9	0.13	*Can occur in isolation and with others except 2b(1), 2d*
2G	more CCS	0	429	65	Negligible			*Can occur in isolation and with others Except 2b(1), though is likely to be a subset of 2E*
2G	More IC	0	0.03	Neg	0	7	0.99	*Can occur in isolation and with others*
2G	More wind	0	62.5	9	0	0.4	Neg	*Can occur in isolation and*

[72] Based on DECC discussions with KPMG

[73] These represent the net effect from changes capital expenditure on generating assets, generation and carbon costs and capital expenditure on network assets relative to a base case scenario.

								with others. Except 2b(1)
Total*		**0**	**1,140**	**173**	**0**	**18**	**3**	

* - excluding 2d, 2e

168. Since conflicts 2b(1), 2d and 2E all relate to over-procurement of capacity, we believe these are unlikely to occur simultaneously. Even if they did, there would likely be double-counting of the resource costs. Therefore, taking a conservative and cautious approach, we have taken conflict 2b(1) which has the highest resource cost as the primary conflict which occurs alongside others and this is used as a maximum resource cost in our subsequent assessments. In summary, the highest value from conflict of interest is **£1,140m** (with a best estimate of **£173m**) the majority of which consists of the highest over-procurement of capacity (£648m as per 2b(1) plus the CCS conflict of interest (£429m which is a subset of 2G) .

169. In their analysis of 2d (favouring of generation solutions over demand-side response), KPMG assessed that although this conflict has a low probability in the overall assessment, in the initial few years the probability could be medium, as the initial role of DSR in terms of its full potential is unclear in a pre-EMR/DSR world. Therefore, DSR may take time to build up a track record and as such, detectability is weaker at the outset of the EMR period.

170. We have also tested the implications with a higher probability for the initial 5 years (2014-2018) – i.e. a medium range of 33%-66%. Taking a conservative approach and applying the highest probability of the medium range (66%, noting that KPMG's analysis suggests a mid-point rather than the upper end of the range) for the initial 5 years suggests that this conflict would still have a lower associated resource cost than 2b(1) (i.e. £575m, as opposed to £640m for 2b(1), as per Table F1 above). Being the highest cost conflict, we take this as the primary conflict.

171. We have also assumed in this IA that the business separation measures we put in place under each option are fully effective. In reality, business separation can never be fully effective against inherent or subconscious bias or against 'rogue operators'. The benefits in terms of mitigating conflicts are presented in a range in any case so we believe this also takes account of the uncertainty of them arising.

Annex E: Option 3 – System Operator (SO)/Transmission Owner (TO) business separation costs

172. The cost of the ring-fence under Option 3 is the highest of any option, as it separates many existing functions currently integrated between System Operator (SO) and Transmission Owner (TO). These can be difficult, costly and time-consuming processes, with significant potential for unforeseen consequences.

173. We have considered various sources of evidence for the compliance costs of this separation, both within and outside the energy sector.

Examples within energy sector

174. We have worked closely with Ofgem to identify suitable comparators on which to base estimates of costs of separation, based on evidence from similar separations in the energy sector. The following examples were identified:

- Centrica Rough storage – A new acquisition by Centrica, rather than separating an existing business, with a very different cost base. Therefore, we did not consider it relevant for the separation of an integrated company on the scale of NGET.
- Sale of four UK regional gas distribution networks in 2004[74] – Mainly divestment rather than ring-fencing; no available evidence on cost of any ring-fencing that was carried out.

175. Given the absence of suitable examples within the energy sector, we looked at potential examples from other regulated sectors, where business separation was applied:

Examples outside energy sector

- BT Openreach –Due to the way this was implemented within BT, it is difficult to assess exact costs. However, overall costs for the split were estimated at £100m[75] and we have used it to sense-check the analysis below.
- Potential separation of water retail from vertically integrated companies – A possibility explored by Ofwat and Defra in 2009 which, despite not occurring, did involve gathering substantial evidence. As a result, we believe that this provides the most reasonable proxy for this option.

176. For the potential costs of separation of retail water businesses, Ernst & Young[76] looked at 3 levels of separation–:

- accounting separation,
- functional separation (arm's-length interaction), and
- full legal separation (separate legal entity).

177. In discussions with Ofwat, we understand that this analysis also cited other examples of costs of separation, such as for the water industry in Scotland and in other sectors:

- The costs of separation of the water business companies in Scotland[77] were estimated to be £2m-£3m for small companies and £6m-£10m for large companies. Therefore, across the full range such costs would be £2m-£10m; excluding fixed costs, these costs would be £0.5m-£7.5m. On a per-customer basis this, equates to £**4-£8 per customer**.

[74] http://www.ofgem.gov.uk/Networks/GasDistr/otherwork/Documents1/8895-25504a.pdf
http://www.nationalgrid.com/corporate/Media+Centre/Press+Releases/Global+Press+Releases/Saleoffourgasdistributionnetworksandproposed2billiononeoffreturnofcapitaltoshareholders.htm
[75] Based on discussions with Ofwat on Ernst &Young work which also looked at other sectors (as discussed later)
[76] http://www.ofwat.gov.uk/competition/review/pap_pos_090716threshold.pdf
[77] This separation occurred in April 2008, when the market was opened to competition

- The costs of separation of the Public Electricity Suppliers (PES) in the UK[78] required separation of their distribution and supply businesses. The Regulator (OFFER) allowed £8.5m in total for the separation costs (where full physical separation was required), equating to **£3-£13 per customer**.
- The separation costs associated with the creation of Openreach by BT[79] were estimated to be £100m, equating to around **£4 per customer**.

178. The Ofwat Impact Assessment[80] provides a summary of the costs of separation of retail activities for typical small and large-sized companies. In this analysis, a large company is assumed to have 1m billed customers and 1,000 employees. Legal separation was between 52%-54%, 4% more costly than functional separation in terms of set-up costs, and 132%-237% more costly for on-going costs.

Table E1: Evidence on costs of legal separation for large company (1m billed households, 1,000 employees), based on Ofwat analysis

Type of separation	Total costs (£m)			
	Transitional costs		Recurring costs	
	Low	High	Low	High
Legal	**1.2**	**2.4**	**0.5**	**1.1**

**Figures are rounded*
Source: Ofwat

Application of E&Y report to derive NG separation costs

179. The figures in Table E1 above have been extrapolated[81], based on National Grid's estimate of customer projections[82] and data on numbers of gas and electricity business meters[83]. This assumes a one-to-one relationship in customer numbers and costs to derive a high-level indicative cost of likely separation costs for the SO/TO roles of National Grid[84].

180. Table E2 below presents these extrapolated costs. To achieve functional separation, one-off/transitional costs are estimated to be **£27m-£53m**, with recurring costs of **£7m-£11m per year**. In the case of full legal separation, the costs are greater, with one-off costs ranging between **£40m-£82m** and recurring costs of **£17m-£37m per year**.

Table E2: Estimated costs of business separation of a National Grid-sized business (34m customers), based on Ofwat analysis

Type of separation	Total costs (£m)			
	Transitional costs		Recurring costs	
	Low	High	Low	High
Legal	40	82	17	37
Functional	27	53	7	11

**Figures are rounded*
Source: DECC estimates based on Ofwat evidence

181. Putting the above numbers into the context of costs per customer[85] we can see from Table E3 below that the costs under functional separation are up to £1.59 per customer for transitional costs

[78] In 2000 the 14 Public Electricity suppliers were required to separate their distribution and supply businesses
[79] Openreach is the infrastructure division of the British telecommunications company BT Group. It was established in 2006 following an agreement between BT and Ofcom to implement certain undertakings, pursuant to the Enterprise Act 2002, to ensure that rival telecom operators have equality of access to BT's local network
[80] http://www.ofwat.gov.uk/competition/review/pap_pos_090716threshold.pdf
[81] It should be noted that NG employees around 27,000 people so whilst we could have upscaled based on the employee component (factor of 27) we have taken a cautious approach to costs by upscaling based on customer no's (factor of around 34)
[82] UK Future Energy Scenarios, National Grid, November 2011
[83] Electricity - https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics-2005-to-2011 ; Gas - https://www.gov.uk/government/statistical-data-sets/gas-sales-and-numbers-of-customers-by-region-and-local-authority
[84] This also assumes that similar costs are incurred when activities are re-organised/transferred, in achieving the various types of separation
[85] As per footnote 79 above

and £0.33 for ongoing costs. With the highest degree of separation, these costs rise to as much as £2.44 for transitional costs and £1.11 for ongoing costs. These costs for full legal separation are not too dissimilar to the per-customer cost estimates of full separation given by the Ernst & Young work for Ofwat in other business areas, as highlighted above.

Table E3: Per-customer costs of different levels of business separation

Type of separation	Costs per household (£)			
	Transitional costs		Recurring costs	
	Low	High	Low	High
Legal	1.21	2.44	0.50	1.11
Functional	0.8	1.59	0.21	0.33

182. Using information from Table H2, it is estimated that the full costs associated with separating the EMR function and SO (functional through to legal) are estimated to be **£27m-£82m** for total set-up costs and around **£7m-£37m per annum** in ongoing costs. Therefore, on a Present Value basis over the period 2014-2030, the total costs (both set-up and ongoing) would equate to **£117m-£550m**.

Annex F: Non-monetised costs & benefits – Value of synergies between SO/EMR delivery functions

183. Synergies are the benefits from doing two things together. In the case of EMR, these are the benefits presented by having the System Operator also fulfilling the delivery role for EMR.

184. The value of synergies is inversely related to the cost of conflicts - as the degree of business separation is increased, the benefits associated with synergies are reduced.

185. Synergies can be grouped into the following 3 categories

- Operational cost savings: These are synergies that manifest as economies of scope, due to the similarity in roles between the SO and EMR delivery. It also represents the operational savings achieved by having access to shared, IT, facilities, HR, Legal etc.
- Better system outcomes: These synergies come about through delivering EMR, which can lead to efficiency improvements for the SO, e.g. lower balancing costs, more efficient reserves procurement, system planning benefits.
- Better EMR outcomes: Cost savings due to EMR being delivered in a more efficient way. These can be achieved through leverage of National Grid's experience as SO, including more efficient CfD strike price setting, efficient demand and reserve margin analysis for the Capacity Market, efficient capacity procurement, fewer blackouts, diversity in generation mix, and auction experience.

The table below sets out a high level qualitative analysis of the synergies.

Table F1: Qualitative analysis of synergies

Synergy	Qualitative Description	KPMG analysis
Operational cost savings	One efficiency benefit is that the SO's current activities provide learning benefits for the activities associated with the delivery of EMR. There is organisational intelligence and expertise in place, facilitating knowledge-sharing and faster turnaround of analysis required for the EMR role. A cost saving occurs here since a new organisation would have to learn from scratch and invest in setting up systems, acquiring data, establishing processes, etc. There will also be cost savings through the avoidance of duplication of work. This would occur since SO staff already perform some of the analysis required for the EMR role (for instance, SO analysts already forecast future capacity and generation mixes to inform NG's network build). Integrating staff into a single EMR/SO capacity would remove the need for this analysis to be performed twice. To the extent that NG's existing property, equipment and other administrative expenses (including HR, IT, data services, and legal) can be used for its EMR role, the costs under these categories would represent a saving compared to the start-up costs of an alternative administration and delivery body.	Given National Grid's institutional knowledge, established processes and systems, the likely steep learning curve for staff in technical roles, and their established presence in the market, KPMG have estimated that the likely size of these operational synergy (as a percentage of the costs associated with setting up a new entity as the delivery body) is significant.

Better system outcomes	National Grid will have a larger evidence base and perform more analysis if it is undertaking both the EMR and SO role than it will if it is undertaking only the SO role. Consequently, if undertaking both roles, National Grid will have more accurate information from a greater number of sources. Use of this information could improve some of the forecasting functions performed by National Grid, which would result in better SO outcomes. For example, enhanced market intelligence can help National Grid provide a more realistic assessment of future network build requirements. Similarly, a more certain assessment of the future generation mix and better information around when plant will come online could improve system planning and reduce constraint costs. The cost of operating the system (balancing the system and managing constraints) was £886m in 2011/12.[86] This increased knowledge could facilitate more efficient procurement of reserves to ensure short-term balancing in terms of volume, flexibility and location. In this way, the SO's balancing costs could be reduced.	KPMG's qualitative assessment of the system outcome synergies highlighted that the potential impact will depend on both the extent to which business separation and information restrictions between the SO and EMR functions already exist, and the extent to which the SO is able to exert influence (or exercise discretion). On the former, the greater the degree of separation, the smaller the benefit of potential synergies from a joint role. On the latter, while the delivery of the EMR role would likely provide the SO with better information, the value of such information is limited by how much the SO can do to influence decisions made by generators. As KPMG felt that such influence is currently limited, they do not expect these synergies to be significantly realised.
Better EMR outcomes	The factors that lead to better SO outcomes as a result of combined SO and EMR delivery functions can also result in better EMR outcomes (i.e. increased efficiency and cost savings in delivering EMR). For example, leveraging existing National Grid skills and experience may result in more efficient strike price setting through the SO's experience in coordinating with stakeholders, performing analysis, and managing information flows. Similarly, a joint role could provide National Grid with a more accurate assessment of energy demand, system constraints, and the resulting capacity requirement for system reliability. This improved information base could facilitate more informed, and therefore efficient, procurement of capacity under the Capacity Market. National Grid has experience designing and running auctions for the Short Term Operating Reserve (STOR) service[87]. This experience could better enable it to design and manage a system that ensures appropriate market participation in the Capacity Market and enables it to perform the required checks to ensure reliable capacity comes forward. This may increase the reliability of capacity procured through the auction and would likely reduce the costs of running the auctions both for consumers	KPMG's qualitative assessment suggests that that the potential impact on better EMR outcomes will depend on the extent to which business separation and information restrictions between the SO and EMR functions exist. KPMG consider that the cost savings from leveraging National Grid's skills and experience may be significant, particularly in terms of improved efficiency and communication with industry. Given the importance of transparent, efficient communication, well-run auctions and robust and efficient analysis to the overall success of EMR, KPMG felt these benefits were significant.

[86] Synergies and Conflicts of Interest arising from the Great Britain System Operator delivering EMR Consultation Document, page 28.

[87] STOR is a service for the provision of additional active power from generation and/or demand reduction to ensure system security by matching energy supply and demand.

	and participants. More generally, National Grid has experience of operating and designing a number of processes in which industry participates. This experience could result in more efficient and less onerous participation from industry.	

Annex G: Non-monetised costs and benefits – Investor & industry confidence in EMR

186. The success of EMR depends on investors building the new electricity generation needed to meet low-carbon goals or to invest in capacity required through the Capacity Market. If they do not trust National Grid to deliver EMR, this may negatively affect their willingness to invest, or otherwise participate in EMR.

187. The responses to call for evidence and consultation, along with stakeholder engagement through DECC's Institutional Frameworks Expert group[88] has suggested that there is concern amongst stakeholders about conflicts of interest. This may impact whether industry and investors choose to participate in the EMR instruments or whether they provide the information required (i.e. technology costs data on renewables) in order to produce analysis based on the best available evidence.

188. Although we have not been able to assess the value of this stakeholder confidence under the cost-benefit analysis for each of the options, we have set out some illustrative impacts below. In terms of the assessment below, we have used our engagement with stakeholders (including through submissions to the consultation) as a guide to gauge the effectiveness of each option at meeting stakeholder concerns.

189. There are two areas where we have identified potential costs (or benefits, where these are avoided costs under any options):

(i) Negative impact on investor confidence, and

(ii) Inferior evidence base for the EMR Delivery Plan, due to stakeholders not trusting National Grid and thus not submitting evidence.

Negative impact on investor confidence

190. Despite discussing the issue with several stakeholders, it has not been possible to monetise this cost directly. One stakeholder said that the scale of the risk compared to other regulatory risk issues was so small as to be negligible by comparison. Nevertheless, to provide an illustrative example of the impact this could have on projects, we have assessed what impact this additional risk could have on financing a new project. These financing costs are referred to as hurdle rates and, given the potential increase in risk as a result, we have assumed a 0.1 percentage point increase.

191. Analysis for the Electricity Market Reform impact assessment[89] suggests that with CfDs, hurdle reductions of up to 1.2% are possible depending on the technology type. However, any investor confidence uncertainties would almost certainly lead to increased financing costs (or hurdle rates), hence the CfD reductions may not be fully realised. In monetary terms, an increase in the hurdle rate of 0.1 percentage points in 2016 would lead to increased cost over all years to 2030 of £17m (on a Present Value basis). It is likely that these additional costs would be passed on to consumers as increases in their electricity bills. However, as this is merely illustrative and we do not have any evidence on which to base this sample increase in hurdle rates, we have not included these numbers in the quantitative cost-benefit analysis.

Inferior evidence base for EMR Delivery Plan

192. A lack of confidence in the System Operator in its handling of stakeholder data could lead to additional costs. Stakeholders suggested through the call for evidence their concerns that National Grid would use confidential data submitted to it in its EMR Delivery Body role for its own commercial gain.

[88] http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=27&refer=Markets/WhlMkts/EffSystemOps
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66555/7121-synergies-and-conflicts-of-interest-emr-consultati.pdf
https://www.gov.uk/government/policy-advisory-groups/116

[89] https://www.gov.uk/government/publications/energy-bill-impact-assessments

193. This concern could then lead those stakeholders to refrain from submitting evidence (or submit inferior evidence) for the analysis that National Grid will be carrying out to inform Ministerial decisions on EMR. The feedback from stakeholders seems to suggest some will consider acting in this way. This could lead to CfD strike prices being set either too high or too low, either over-subsidising low carbon technology at a cost to the consumer or providing insufficient incentive for new low-carbon projects to be pursued, meaning we fail to meet our decarbonisation targets.

194. It is difficult to gauge the exact likelihood of this issue occurring or the impact if it did. Therefore, we have again used an illustrative approach to represent the potential impact. In this case we have assumed that it will cause an inefficiently-set CfD strike price and an inefficient procurement of capacity. Building on the analysis in the Electricity Market Reform impact assessment[90], if it is assumed that CfD strike prices are £1/MWh higher each and every year between 2016-2030 for all technologies, the total additional cost could be around £1bn in Present Value terms. Similarly, as these estimates are purely illustrative, we do not use them in the quantitative cost-benefit analysis.

[90] Op cit, as per footnote 68