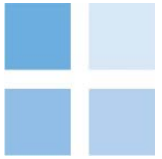
Cambridge Economic
Policy Associates

NSP Expenditure Incentives

Stakeholder Workshop

23 April 2018



Agenda

- Introduction
- Financial incentives in the current framework
- Observable indicators
- Financial incentive strength – modelling results
- Other incentives
- Conclusions

1 INTRODUCTION

Previous views and analysis

From the NEM

Power of Choice (2012)

- AEMC - under prevailing rules, *"a clear bias to capital expenditure in favour of operating expenditure, both in terms of the potential to make profit and certainty about cost recovery".*

DMIS rule change (2015)

- AEMC - DNSPs *"have no financial incentive to factor in broader market benefits from non-network options and they may have limited incentives to trial new non-network options"*.
- Led to introduction of DMIS and DMIA

DMIS (2017)

- AER - regulatory treatment of opex/capex could lead to capex bias if NSP:
  - Prefers relatively stable long-term cash flows.
  - Receives an allowed rate of return above its actual WACC.
  - Values options to defer capex less than consumers, due to protection from overinvestment that NSPs receive under the current rules.

Institute for Sustainable Futures (2017)

- Found bias in favour of network capex rather than non-network opex.

Contestability rule change (2017)

- AEC - concerns that NSPs biased towards:
  - Capex over opex solutions
  - In-house approaches over outsourced approaches
  - Their own ring-fenced affiliates over third-party providers

Previous views and analysis

From other jurisdictions

Ofgem

- Capex bias concerns emerged under DPCR3 (1998)
- No conclusive evidence – concerns centred around capitalisation policies and impact of opex benchmarking.
- Main steps to address perceived bias started under DPCR5, leading to current totex approach.

Ofwat

- 2011 paper found self-fulfilling *perception* of capex bias.
- Also concluded that companies responded to complex incentives in unintended ways.
- Most recent price controls adopted totex approach.

Grey Review

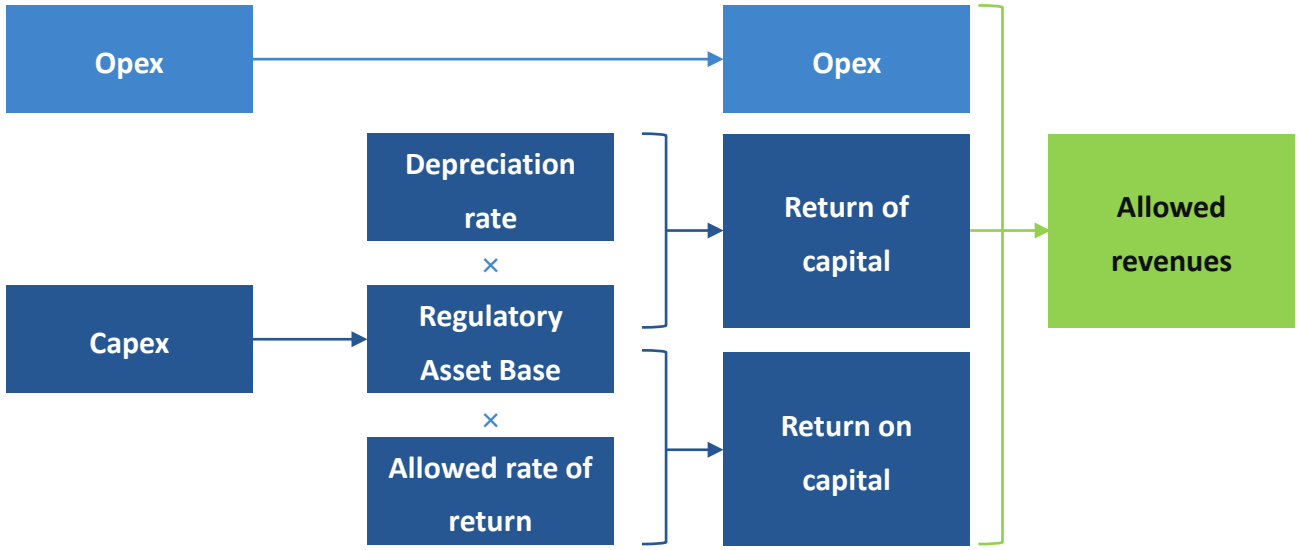
- Independent review highlighted perceived capex bias.
- Capex projects could be clearly defined, and allowed companies to "enjoy the long-term return on the resulting addition to the RCV"
- Opex carried risk of appearing inefficient under opex benchmarking

NY REV

- PSC noted concerns that a return on capex, but not on opex, could lead to a capex bias.
- NY REV framework aimed to remove disincentives to undertake opex.

Current regulatory framework

Building blocks



- Developed in context of requirements for investment in long-lived assets.
- With emergence of distributed energy resources (DER), expected that NSP service provision could increasingly involve opex solutions.

Overall approach

We have considered a range of potential sources of evidence

Overall balance of incentives

Regulatory incentive mechanisms: pre-allowance	Regulatory incentive mechanisms: post-allowance	Observable indicators	Other factors
• Expenditure forecasts • WACC allowance	• Efficiency benefit sharing scheme (EBSS) • Capital expenditure sharing scheme (CESS) • Demand management incentive scheme (DMIS)	• Capex : opex ratios • Performance against capex and opex allowances • Evidence from capex / opex decisions	• Preferences for RAB growth • Perceptions of opex solutions and their implications business risk • Reputational incentives • NSP cultural and organisational factors
Modelling / qualitative analysis		**Historic performance against allowances**	**Qualitative analysis**

Conclusions

Clear that incentives are not equalised across opex and capex

- Evidence does **not point conclusively to a systematic bias**
  - CESS / DMIS have improved balance of incentives across opex and capex, but not in all cases.
  - Modelling of financial incentives indicates that NSPs could face a capex bias, or a weak opex bias, depending on the approach and assumptions.
  - More qualitative analysis indicates NSP/investor preferences for long-term, stable cash flows.
  - Combined with the current RAB-focussed regulatory framework and greater revenue uncertainty under a more opex-intensive business model, this points towards a preference for capex.
- Does not appear that incentives are always balanced.
  - Different biases may prevail at different times. The modelled opex bias is weaker than the modelled capex bias
  - Complex interactions between incentive mechanisms increases the risk of unintended outcomes.
- Across all the evidence there does appear to be a capex bias.
- Under separate opex and capex incentive mechanisms, there is **no simple fix** to equalise incentives in all circumstances.

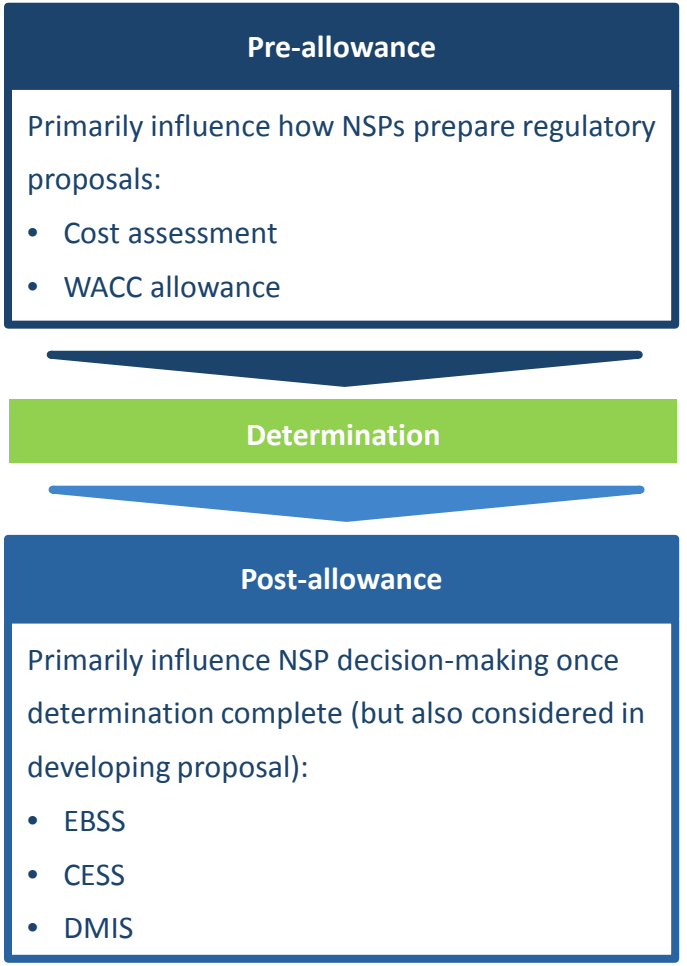
2 FINANCIAL INCENTIVES

Regulatory incentives

We have considered pre- and post-allowance incentives

- Main incentives under the current framework:
  1. Cost assessment process
  2. WACC allowance
  3. Efficiency benefit sharing scheme (EBSS)
  4. Capital expenditure sharing scheme (CESS)
  5. Demand management incentive scheme (DMIS)

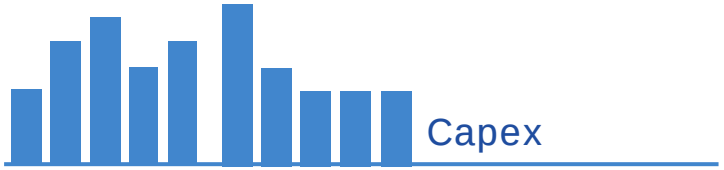
- Interactions - or NSP understanding of interactions - key to outcomes.



1. Cost assessment process

General incentive to obtain allowance above forecast efficient cost, but mechanics of cost assessment may influence capex/opex choices

- AER typically relies on revealed cost base-step-trend approach:
  - Determines efficient opex for **base** year.
  - Applies **step** changes for opex not reflected in base.
  - **Trends** for input costs, productivity and output growth.
- Relies on assumption that opex is relatively constant over time.



- Profile driven by need to replace aging assets and changes in demand.
- Revealed capex useful, but not to same extent as for opex.
- AER must rely on a more bespoke cost assessment and greater degree of judgement.
- More scope for information asymmetry compared to opex.

1. Cost assessment

Does not prove there is a capex bias. However…

1 Cost assessment process creates greater uncertainty around future allowances for an opex project

- If out of sync with other NSP practices, an NSP that adopts opex instead of capex could appear inefficient in benchmarking.
- Opex solutions exposed to input price and productivity changes above/below AER expectation.

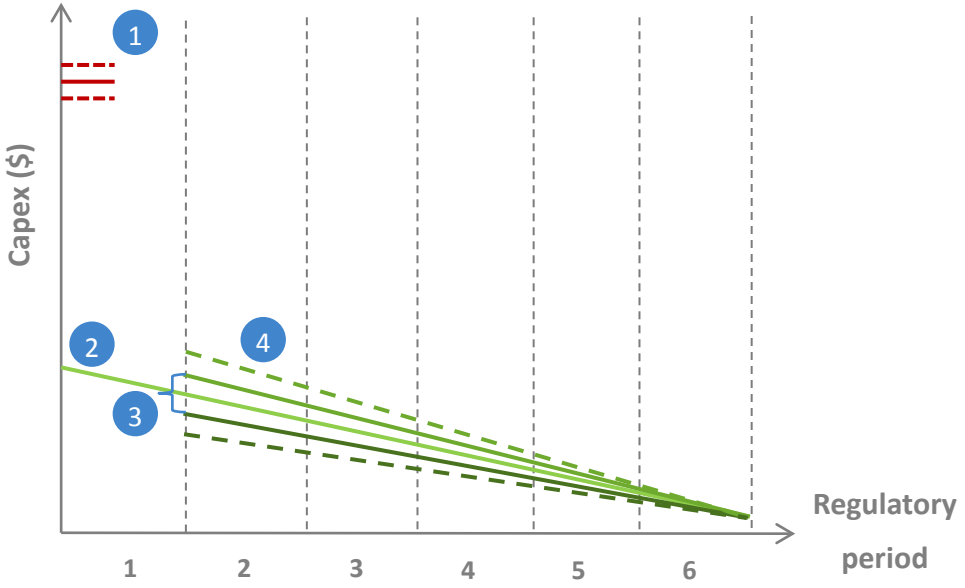
2 For capex, NSP is exposed to risk/reward that actual WACC may be higher/lower than the allowed rate of return.

3 AER may conduct *ex post* capex review, if NSP spends above its allowance.

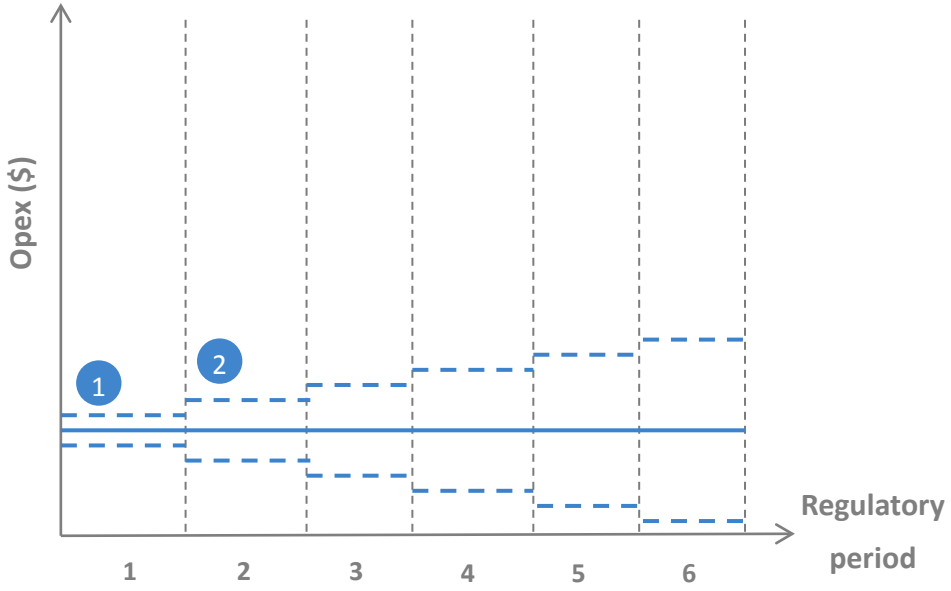
- Encourages NSPs to avoid the review.
- Could also incentivise seeking higher capex allowances to provide headroom.

1. Cost assessment and uncertainty

Higher for opex compared to capex



1. Expected capex and uncertainty (dotted line).
2. Allowed revenue (solid line).
3. Starting revenue for Period 2: actual capex and forecast depreciation in Period 1.
4. As RAB and depreciation are known, NSP only faces uncertainty in future periods from the allowed WACC.



1. Expected opex (therefore allowed revenue - solid line) and uncertainty (dotted line).
2. NSP's uncertainty on future revenues, as viewed from 'day 1', increases at each determination - the allowance may change to reflect out-turn opex in the previous regulatory period.

2. WACC allowance

Neutral capex/opex incentive, if allowed WACC matches actual WACC

- Allowance set against the BEE
  - WACC determination relatively transparent.
  - NSPs should be able to estimate allowed WACC when preparing their regulatory submission.
- If NSP believes it can **outperform** allowed WACC => may favour capex solutions over opex solutions to increase the RAB (assuming a trade off is possible)
- If NSP expects to **underperform** allowed WACC => may prefer to reduce capex in favour of opex solutions (assuming a trade off is possible) – although this may be offset by the opex assessment process described above.

2. Exposure to systematic and business risk

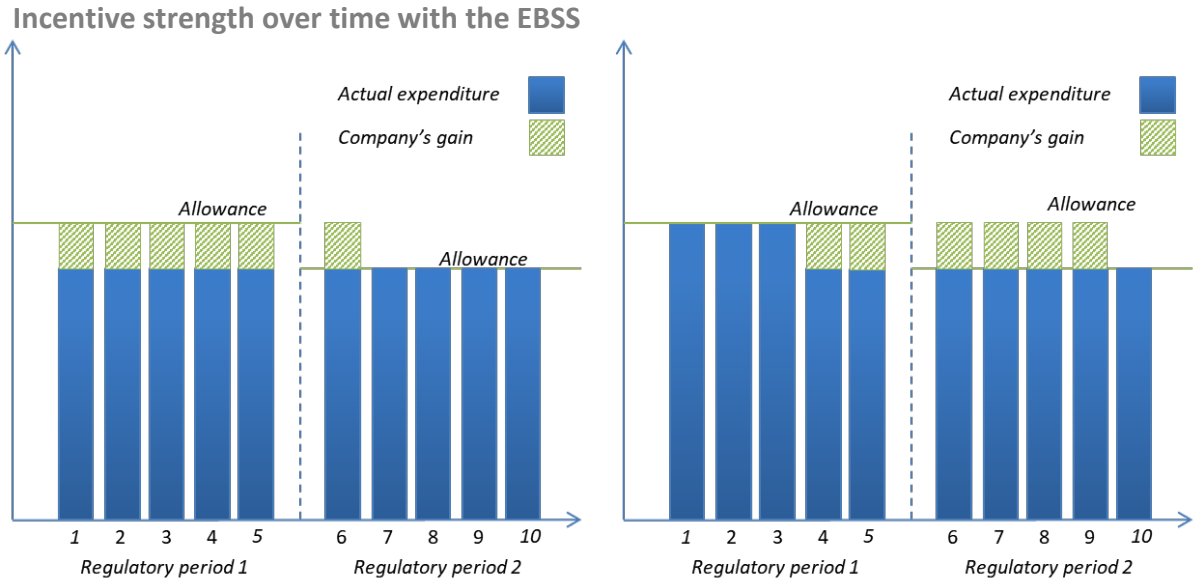
If opex solutions seen as 'riskier', an incentive to prefer capex

- Cost of capital increases with greater exposure to systematic risk (beta component of cost of equity).
  - Incentive to reduce exposure to systematic risk where possible.
  - If main systematic risk exposure relates to opex cash flows, NSP may prefer to undertake capex projects.
- Company-specific risk may also affect incentives.
  - Investors can diversify to limit exposure to company-specific risks.
  - Still likely to be concerned with how NSP appropriately manages company-specific risks.
  - Engaging in more 'risky' solutions may increase volatility around expected returns.
  - Debt providers also concerned about company-specific risk, due to downside exposure if company fails or underperforms.

3. EBSS

Aims to equalise incentive for efficiency gains across time

- Introduced to:
  - Remove incentives for NSPs to increase base year costs in order to increase allowances
  - Equalise incentives to achieve efficiency gains over the entire regulatory period.
- EBSS allows NSP to keep recurring savings (or bear recurring losses) for six years.
- 30% sharing factor, based on an in-perpetuity calculation and 6% WACC.



4. CESS

Better balances incentives over time, and with opex

- Introduced to work alongside EBSS to:
  - Equalise incentives to achieve capex savings over the entire regulatory period.
  - Balance incentives across opex and capex.
- Allows NSP to retain (bear) 30% of any under / overspend compared to their allowance.
- 30% is the *pre-tax* sharing factor.
- Capex overspend may be subject to *ex post* review, through which AER may decide to remove capex from the RAB and reverse CESS penalty reward
- CESS may also be adjusted in the case of material deferrals (more on this later)

5. DMIS

Aims to balance incentives for NSPs to undertake DM projects

- Design finalised by AER in 2017, to apply from April 2018.
- Responded to AEMC finding that DNSPs had "*no financial incentive to factor in the broader market benefits from non-network options and they may have limited incentives to trial new non-network options" (2015)*
- For eligible DM projects, DNSPs may receive incentive payment capped at the lower of:
  - Expected present value (PV) of DM project costs x cost multiplier (currently 50%).
  - PV of the project's net benefit.
- Maximum incentive payment in any one year capped at 1% of total revenue allowance.
- Requires DNSPs to:
  - Assess whether the DM solution is the preferred option (RIT-D or minimum project evaluation requirements).
  - Prepare and submit an annual compliance report to the AER.

Summary

Interactions between the different incentives are complex

Incentive	Influence on NSP decisions	Contributes to a capex bias?

Cost assessment	• Overall incentive to seek higher capex and opex allowances.
	• Efficiency gains reduce future opex allowances.
	• Capex typically 'one off' bespoke assessment.
		Potentially
		• Possible incentive to propose capex rather than opex to:
		  • Improve performance in opex benchmarking.
		  • Provide headroom to avoid *ex post* review.
		  • Increase certainty over future allowances
		• Due to information asymmetry, capex may be (or perceived to be) able to gain approval more easily.

WACC	• Incentive to outperform WACC allowance. • More 'risky' innovative or alternative opex solutions may increase volatility around the expected return.	**Potentially** • If NSP believes it is likely to outperform the WACC. • If NSP considers that opex solutions could increase exposure to systematic and business-specific risk.
EBSS	• Equalises incentives over regulatory period. • Incentive to reduce opex (although leads to reduction in base opex in next period).	**Potentially** • If incentive strength is not balanced across the CESS and EBSS.
CESS	• Equalises incentives over regulatory period. • Achieves better balance between capex/opex.	
DMIS	• Specific reward for eligible DM projects. • Can influence NSP decisions before and after price determination.	**No** • More likely to counter a capex bias (if any), to extent that DM solutions would involve opex rather than capex.

Questions / morning tea break

- Do stakeholders agree with our summary of how the regulatory incentives may / may not contribute to a capex bias?
- Are there other regulatory incentives that should have been considered?
- Other questions or comments?

3 OBSERVABLE INDICATORS

Potential indicators

Can we find empirical evidence of a capex (or opex) bias?

- As discussed above, not clear *a priori* whether combined incentives are likely to point NSPs towards capex or opex solutions.
- In principle, may be able to infer whether a bias exists from past NSP decisions.

Potential sources of empirical evidence	
Changes in capex:opex ratios over time	• Increasing ratio of capex to opex could lend support to a capex bias. • Assuming regulatory framework / operating environment were stable.
NSP performance against capex or opex allowances	• Relatively high capex outperformance compared to opex could indicate information asymmetries i.e., NSPs putting forward additional capex as it is relatively harder to assess. • Alternatively, relatively high/ low levels of capex outperformance could be driven by demand being lower/ higher than forecast.
Evidence from NSP decisions	• For example, analysis undertaken through the RIT-T / RIT-D process. • Could support a capex bias if opex solutions are not considered, or inappropriately assessed.

Summary

In practice, drawing firm conclusions from the observable indicators is challenging

- No long time series under a consistent regulatory framework / operating environment:
- During most recently completed DNSP price controls (2009-15), actual demand well below forecast, and augmentation capex dropped substantially.
- Assessment of the RIT-T/RIT-D's
  - Note AER's observations on inconsistent engagement / information in non-network options reports.
  - We have not assessed whether more optimal non-network solutions were passed over - requires a detailed technical analysis.
  - Also difficulties with drawing general conclusions from specific projects.

4 FINANCIAL INCENTIVES – MODELLING RESULTS

Modelling overview

Modelling compares choices of two NSPs with identical starting points

- NSPs start with:
  - Same opex and capex allowance.
  - Same WACC allowance and allowed WACC.
- Faced with opportunity to underspend / need to overspend against allowance:
  - One chooses to out/under-perform only on opex (OpexNSP)
  - One chooses to out/ under-perform only on capex (CapexNSP).
- We have modelled the NPV impact of their choices, and compared the difference.
- Opex and capex solutions are set as equivalent
  - Same cost in PV terms.
  - Solutions lasts for the same duration and provides same reliability/safety outcome.
- The model:
  - Includes CESS and EBSS; but
  - Excludes the DMIS and STIPIS.

NPV ratio

Compares outcomes for the two NSPs

- Modelling results provide a net present value (NPV) impact of each NSP's decision.
- We compare the impact across the Opex NSP and Capex NSP through an 'NPV ratio' metric

	NPV ratio <1	NPV ratio >1
Underspend	Reducing opex provides greater financial return than reducing capex	Reducing capex provides greater financial return than reducing opex
Overspend	Increasing capex minimises losses compared to increasing opex	Increasing opex minimises losses compared to increasing capex

Ratio below 1 supports a financial capex bias	**Ratio above 1 supports a financial opex bias**

Modelling assumptions

Base case

- Model combines a simplified version of the AER's PTRM, RFM, EBSS and CESS models.
- We also assume all values are in real terms, to simplify the model.
- Impact to NSPs modelled on **post-tax** basis
- Allowed WACC = 6%
- Gearing 60/40

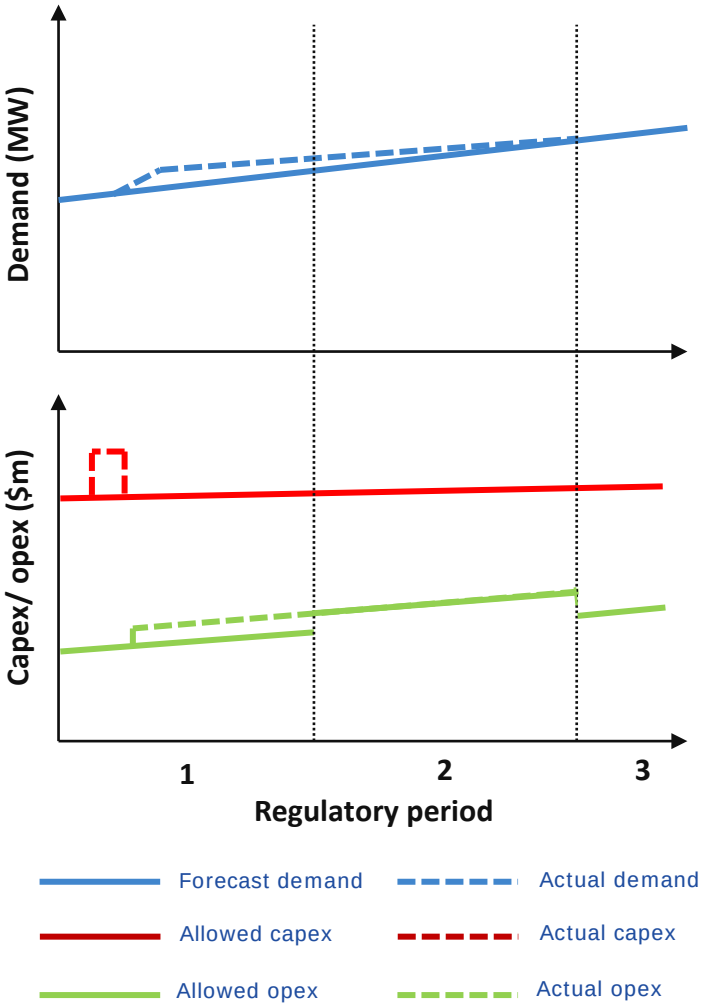
Modelling the capex/opex decision

Different ways that NSP choices could be modelled

- AER has previously looked at the question from a pre-tax, in-perpetuity basis
  - That is, comparing the sharing factor of the CESS, against the implied EBSS sharing factor assuming a 6% WACC and a permanent opex efficiency gain/loss.
  - This approach is consistent with an assessment of ongoing efficiency changes.
- We have also tested a different approach, where an NSP is deciding between discrete, time-limited opex or capex solutions to address a particular network need. This modelling approach asks:
  - assuming NSP can choose between two equivalent opex and capex solutions, that provide the same output over the same time period for the same cost…
  - …do the incentives suggest that they should choose capex or opex?
- Important to highlight that we assume a capex / opex trade off is possible.
- Outline two broad approaches in the following slides, highlighting how the assumptions made can change our conclusions.

First approach

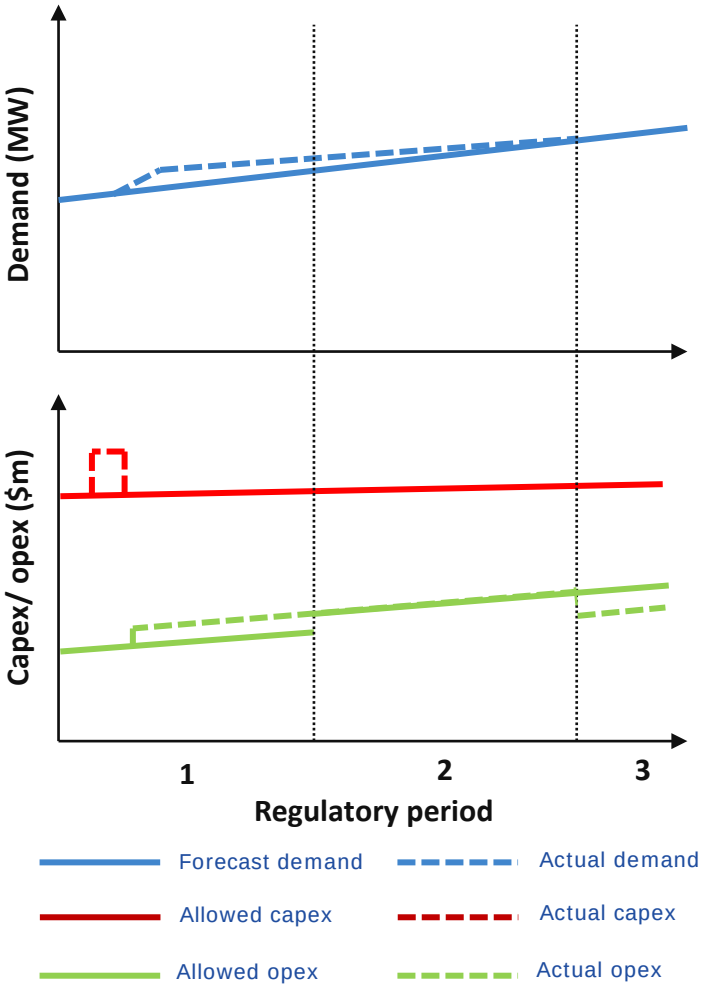
Time-limited solution (allowances adjusted based on outputs)



- Unexpected event requires NSP to respond
- In this example, faced with overspending as demand has increased faster than expected.
- If demand reaches the same point eventually, need for a solution will the time-limited.
- For example, NSP can install a grid-scale battery (capex), or contract with an aggregator for services from distributed behind-the-meter batteries (opex).
- In this approach, we assume that once the unexpected requirement ends, the AER would be able to set allowances with this knowledge
- That is, opex allowances would revert to the base level from Period 3 onwards.

Second approach

Time-limited solution (allowances adjusted using base-step-trend approach)



- Again, NSP must respond as demand has increased faster than expected.
- Unlike the first approach, after the opex solution ends, assume opex allowance not adjusted until *next* regulatory period
- That is, allowances are adjusted when NSP reveals the lower level of expenditure.
- May more closely reflect the AER's base-step-trend approach.
- As discussed below, what happens once a solution ends is important for the outcome of the modelling.

Are both approaches plausible?

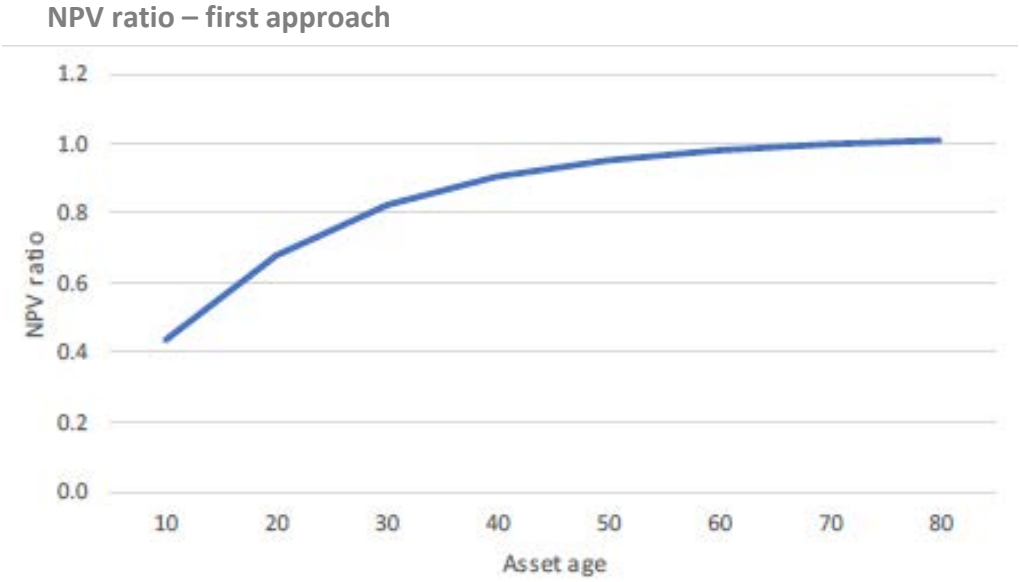
The approaches highlight different scenarios

- First approach useful to illustrate impact of setting allowances based on outputs (e.g., through benchmarking)
  - Demonstrates that setting efficient base expenditure exogenously changes the balance of EBSS/CESS incentives.
  - Highlights issue of compatibility of the current incentive scheme with a benchmarking approach.
- Second approach is more in line with base step trend approach.
- In practice, we don't know whether NSP decision making would follow either of these assumptions.
- Both approaches are stylised… but either could be plausible.

Implications of the two approaches

First approach indicates a capex bias

- Modelling results in NPV below 1 for asset lives of up to 70 years
- Indicates an incentive to substitute capex for opex – where a trade-off is possible.
- Effect more pronounced with shorter asset lives.
- As asset life increases, ratio approaches 1 (closer to an in-perpetuity calculation)

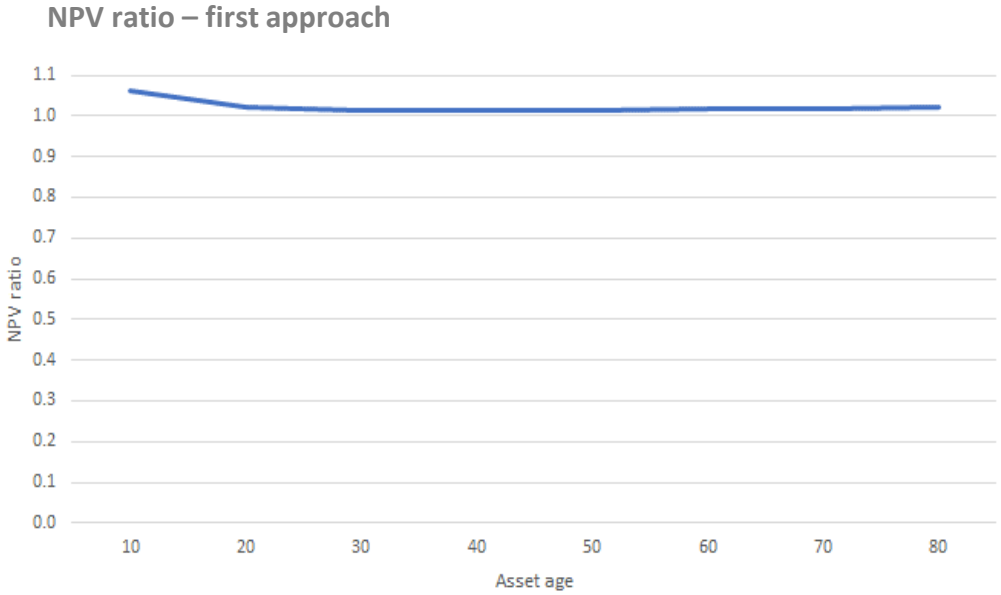


NPV ratio = NPV Capex NSP / NPV Opex NSP		
	Ratio < 1	Ratio > 1
Underspend	Maximise reward if underspend capex	Maximise reward if underspend opex
Overspend	Minimise loss if overspend opex	Minimise loss if overspend capex

Implications of the two approaches

Second approach indicates a weak opex bias

- Modelling results in NPV close to 1 for asset lives of 20 years or more
- Ratio slightly above 1 for shorter asset lives – reflects the different tax treatment of capex and opex.
- Indicates incentives are generally balanced, except for shorter-lived solutions.
- In the latter case, there is a weak incentive to substitute opex for capex – where a trade-off is possible.

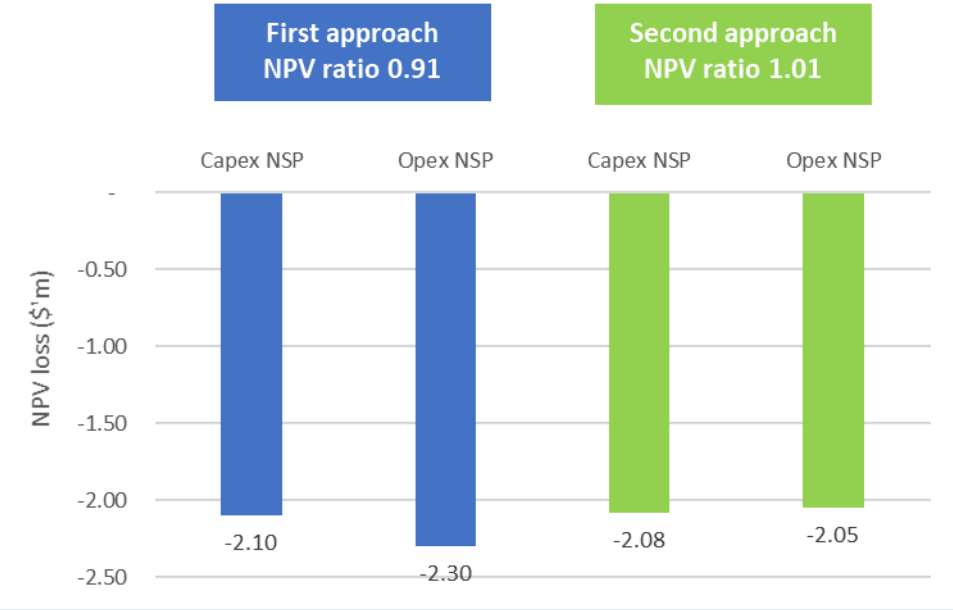


NPV ratio = NPV Capex NSP / NPV Opex NSP		
	Ratio < 1	Ratio > 1
Underspend	Maximise reward if underspend capex	Maximise reward if underspend opex
Overspend	Minimise loss if overspend opex	Minimise loss if overspend capex

Example 1

Underperformance (overspend)

- Both NSPs start with same capex allowance, opex allowance and WACC (6%).
- In Year 1, requirements change – the NSPs now need to spend above their allowance. 40-year 'solution' needed.
- **CAPEX NSP** : identifies capex solution that will cost an extra $10m in Y1.
- **OPEX NSP:** identifies alternative opex solution of additional $0.7m p.a. (PV cost = $10m).
- Both solutions provide the same outcome in terms of PV cost and reliability.

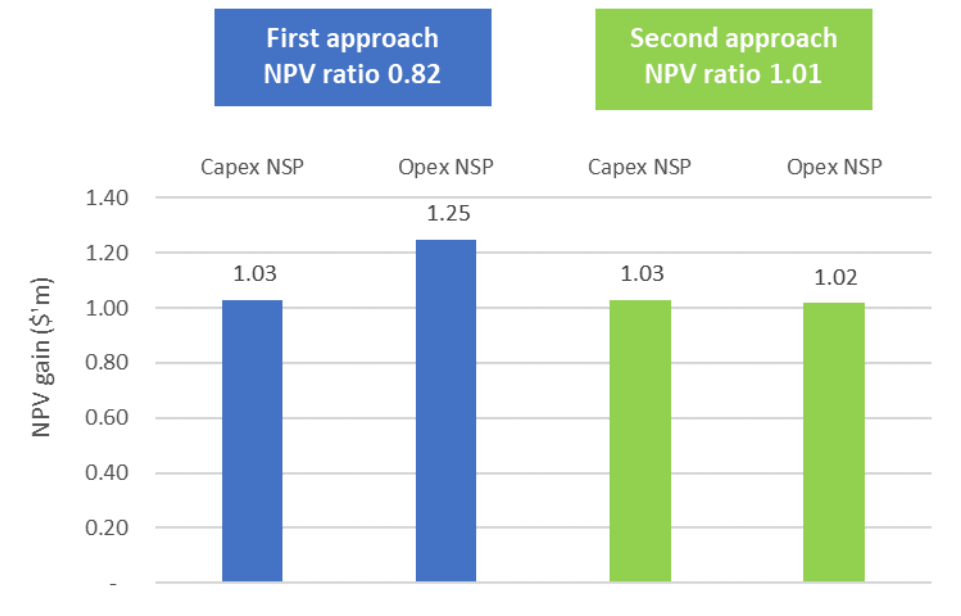


- **First approach:** OPEX NSP is approximately 10% worse off than the CAPEX NSP
- **Second approach:** OPEX NSP marginally better off compared to the CAPEX NSP.

Example 2

Outperformance (underspend)

- Both NSPs start with same capex allowance, opex allowance and WACC (6%).
- In Year 1, NSPs identify an opportunity to underspend. 30-year 'solution'.
- **CAPEX NSP** : identifies capex saving of $5m in Year 1.
- **OPEX NSP:** identifies alternative opex saving of $0.4m p.a., (PV saving = $5m).
- Both solutions provide the same outcome in terms of PV cost and reliability.

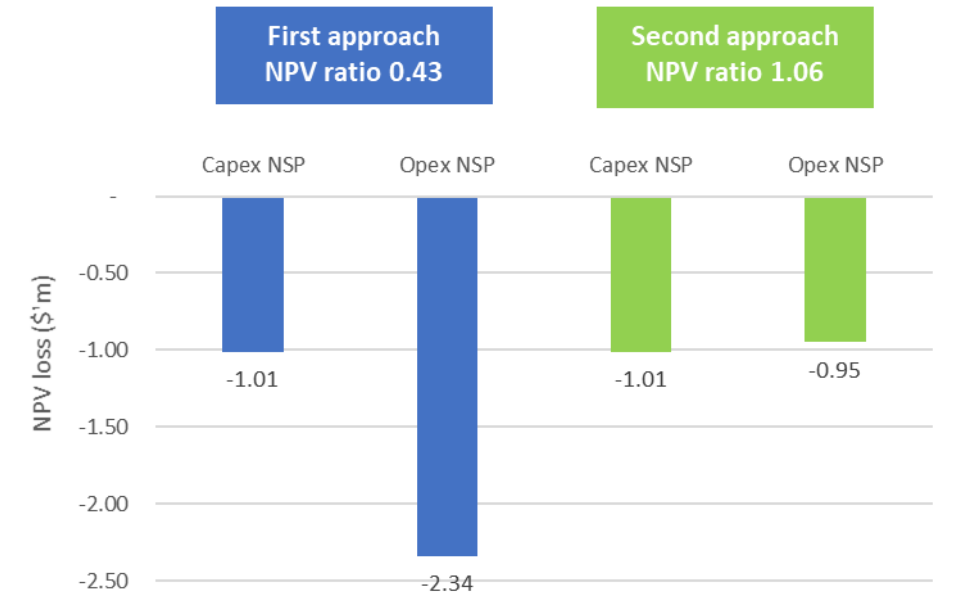


- **First approach:** OPEX NSP is approximately 20% better off than the CAPEX NSP
- **Second approach:** OPEX NSP marginally worse off compared to the CAPEX NSP.

Example 3

Short asset life

- Again, both NSPs start from the same point.
- In Year 1, NSPs identify unforeseen short-term need.
- **CAPEX NSP** : identifies $5m capex option in Year 1 (e.g., installing a battery on the network). The battery has a 10-year useful life.
- **OPEX NSP:** identifies alternative opex solution of $0.7m p.a., over the same 10-year period (e.g., contracting with a DM aggregator). PV cost is the same as for the capex option.
- Both solutions provide the same outcome in terms of PV cost and reliability.



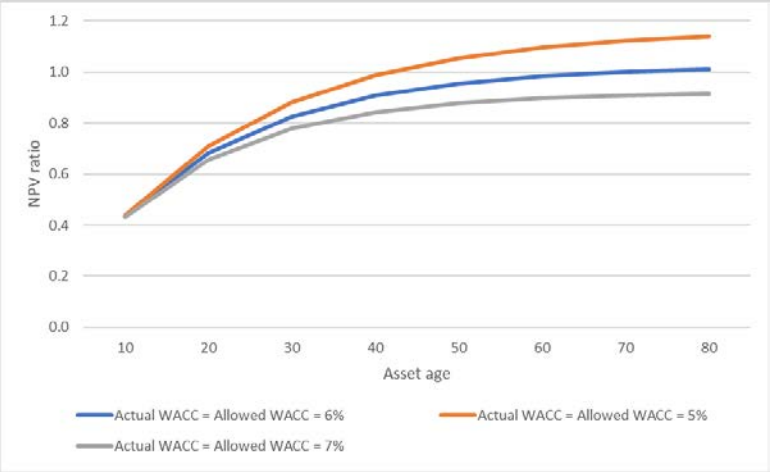
- **First approach:** OPEX NSP is more than 50% worse off than the CAPEX NSP
- **Second approach:** OPEX NSP around 6% better off compared to the CAPEX NSP. Highlights slightly stronger opex bias for shorter asset life.
- Application of DMIS would offset capex bias / strengthen opex bias.

WACC sensitivity

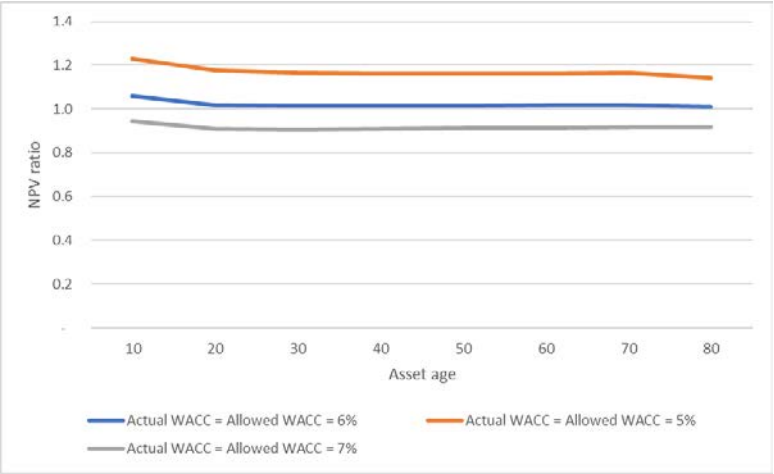
Higher / lower WACC allowance (still equal to actual)

- Tested sensitivity of the NPV ratio to different WACCs (5% and 7%)
  - Lower WACC increases NPV ratio
  - Higher WACC decreases the NPV ratio
- EBSS 30% sharing factor estimated based on 6% discount rate
- With a lower discount rate, the sharing factor decreases (approximately 25% with a real discount rate of 5%).
- This results in an in-perpetuity opex sharing factor below the 30% *ex ante* capex sharing factor.

First approach



Second approach

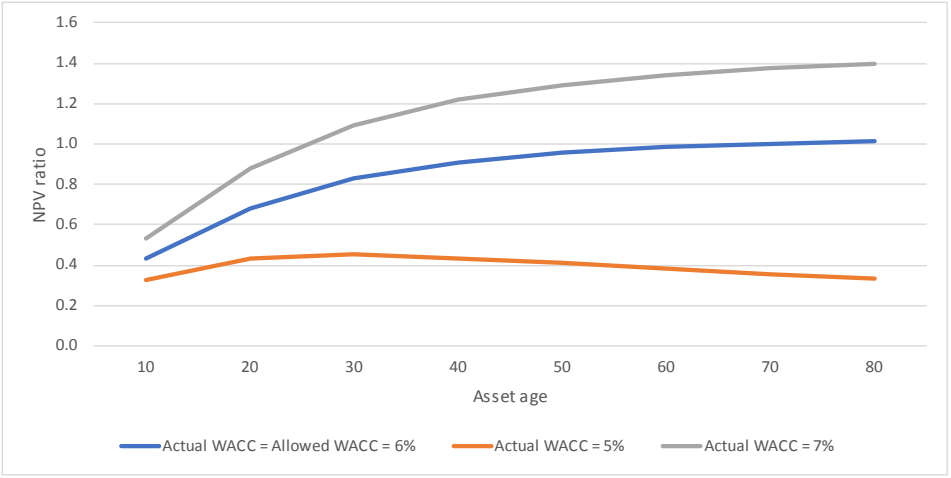


WACC sensitivity

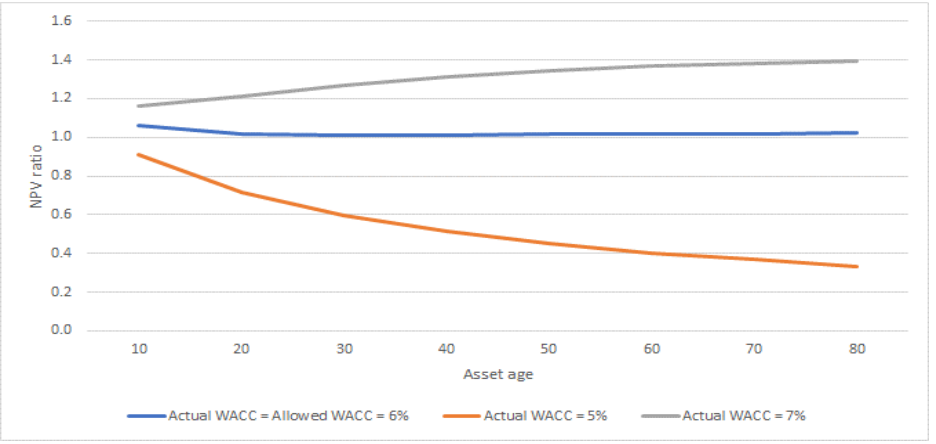
Incentive impact if allowed WACC <> than actual

- If Actual WACC < Allowed WACC : Incentive to increase capex (can earn above required opportunity cost of capital).
- If Actual WACC > Allowed WACC: NSP reduces losses if able to reduce capex (or undertake opex instead of capex, subject to opex cost assessment).
- Conclusion holds under both first and second approach.

First approach



Second approach

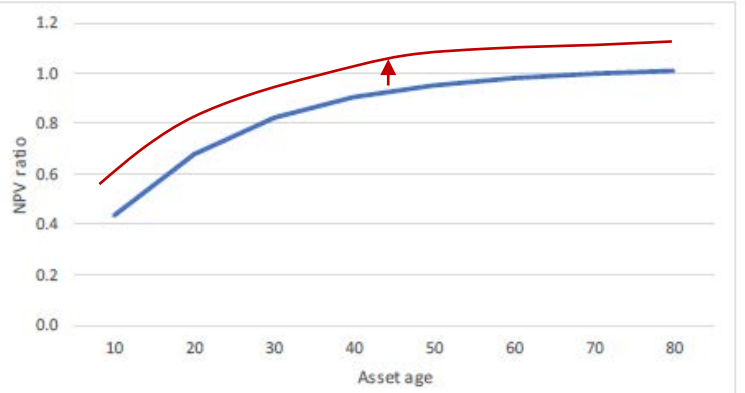


DMIS

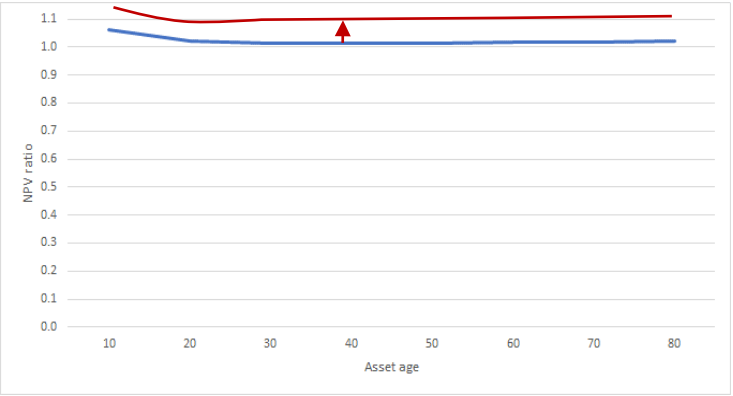
May act to counter capex bias (or increase opex bias) for eligible projects

- Project-specific incentive: have not been able to model *generic* impact on incentives.
- Also, DMIS has not yet been applied in practice.
- Design of mechanism does provide financial incentive to undertake opex rather than capex (or at least to defer capex).
- When applied to an eligible project:
  - Under the first approach, would shift NPV ratio curve closer to 1 (i.e., offset the modelled capex bias)
  - For the second approach, would move the NPV further above 1 (i.e., increase the strength of the modelled opex bias)
  - Extent of the shift depends on the particular project and incentive payment.

First approach



Second approach



Deferrals

What if opex defers, rather than replaces capex?

CESS		EBSS	DMIS
Incentive payments may be adjusted in the case of material deferrals, so that NSP retains only 30% of the deferral benefit (rather than 30% of the capex deferred).	For immaterial capex deferrals (or where AER cannot identify that a deferral has occurred), NSP retains 30% of any underspend – strengthens incentive for deferral.	*Temporary* opex overspends to defer capex are neutralised through later allowance adjustments (NSP only bears time value of money impact).	May also increase incentives for deferrals, for eligible projects.

- Overall incentive depends on a complex interaction of different factors.
  - How deferrals are treated in practice (may be hard to identify; how is materiality defined).
  - Whether DMIS applies.
  - Impact on reliability standards and associated financial / reputational implications.
  - Risk of deferred capex not being approved in future period.
  - Implications of any opex overspend for the benchmarking assessment.

Summary

Financial incentives can vary based on circumstances and assumptions

- CESS has reduced imbalance between capex / opex incentives, but not in all cases.
- DMIS shifts incentives towards opex solutions, but for eligible projects only.
- Depending on the approach taken, combined EBSS/CESS effect could indicate a capex, or slight opex bias.
- Analysis highlights that:
  - On a post-tax basis, the EBSS / CESS incentives are not equalised.
  - It would be difficult to equalise separate capex/opex incentive mechanisms in all circumstances.

Questions / lunch break

- We note that the evidence on observable indicators is inconclusive.
  - Are stakeholders aware of other evidence that would be relevant?
- Do stakeholders agree with the two modelling approaches?
  - Should other approaches be considered?
- Our analysis considers trade-offs between long-term capex/opex solutions. Are stakeholders aware of ‘real life’ examples of this?
- We conclude that deferral decisions depend on many factors.
  - Do stakeholders agree with this conclusion?
  - Do the incentive mechanisms play a large part in NSP decisions on deferrals?

5 OTHER INCENTIVES

Overview

Previous analysis suggests a range of potential contributors to a capex bias, beyond the regulatory financial incentives

Factor	Rationale
1. Focus on RAB growth	• Corporate/investor focus on RAB as driver of earnings growth and long-term stable revenue streams.
2. Risk aversion	• Corporate/investor preference to avoid solutions that are higher risk (greater variability in outcomes), even though they may have a lower expected cost. • To extent that innovative opex solutions are (or are perceived to be) higher risk, could influence capex/opex trade offs.
3. Reputational incentives	• (Perceived) impact of capex/opex solutions on service standards and NSP ranking in benchmarking assessment.

4. NSP culture and skill mix	• Company preferences for particular solutions may reflect:
	  • Ownership (state / private)
	  • Professional background of staff
	  • Organisational structures that separate opex/capex decision making
	  • NSP familiarity with non-network options.

RAB growth

Why might NSPs/investors have a general preference for RAB growth?

- Commentators have suggested that NSPs may focus on growing the RAB because it enables them to 'earn a return' (while opex does not) and the return is stable over time
  - Higher RAB would increase absolute profit level (other factors held equal).
  - But scope to earn return above opportunity cost of capital depends on WACC outperformance.
  - In theory, would not expect NSP to choose RAB growth (instead of more efficient opex solution), unless actual WACC was below the allowed level.

- Nonetheless, review of selected analyst coverage is broadly consistent with a view that RAB growth is a *generally* desirable outcome.

RAB-focussed regulatory framework

The nature of the framework itself may influence preferences

- Current framework developed with a RAB-based approach at its heart.
  - Anecdotal evidence suggests current investors are comfortable with the long-run stable returns under this framework.
  - This may create a self-reinforcing capex bias.
- Shift to opex would reduce investment requirements, but also change them.
  - NSP operational leverage decreases.
  - Uncertainty over NSP liabilities increases.
- Equity may be needed to support working capital requirements – a different proposition to funding capital expenditure backed by the RAB.
- Under the current framework, this could plausibly discourage NSPs from adopting a higher proportion of opex-based solutions.

Risk aversion

Are opex solutions perceived as higher risk?

- Investors / debt providers likely interested in how NSPs manage business-specific risk.
- If opex perceived as increasing company risk, could contribute to a capex bias:
  - Risks managing contracts with third-parties.
  - Uncertainty over how long-term opex contracts could be treated under the cost assessment.
  - Relative to upfront capex, greater degree of cost uncertainty.
  - Uncertainty over expected technical performance.
- These risks have been noted by NSPs in various contexts.
- Plausible contributing factor, although cannot establish extent of impact.

Other factors

Reputational / cultural incentives could also impact choices

- Reputational concerns likely to centre on:
  - Providing network services in a reliable and safe way.
  - Being assessed as an efficient service provider.
  - Anecdotal evidence suggests management may place a relatively high weight on these factors.
- Organisational factors could also influence incentives, for example
  - State-owned NSPs could have different objectives.
  - NSP skill mix or organisational structure could plausibly have an impact.
  - More difficult to infer a particular opex/capex preference from this.

Summary

Factors identified could plausibly influence NSP decisions

- Evidence on these factors is subjective.
- But on balance, more likely to support a preference for capex than not.
  - Perception that RAB growth, and long-term stability of returns, is positive for investors.
  - Plausible that alternative / innovative opex solutions may be perceived as higher risk, even if their expected cost is lower.
  - Perception of opex solutions as higher risk may tend to favour capex, to reduce variability around expected returns and reduce reputational risk.
- Under the current RAB-focussed framework, these factors could plausibly contribute to a preference for capex solutions rather than opex.

6 CONCLUSIONS

Conclusions

Clear that incentives are not equalised across opex and capex

- Evidence does **not point conclusively to a systematic bias**
  - CESS / DMIS have improved balance of incentives across opex and capex, but not in all cases.
  - Modelling of financial incentives indicates that NSPs could face a capex bias, or a weak opex bias, depending on the approach and assumptions.
  - More qualitative analysis indicates NSP/investor preferences for long-term, stable cash flows. Combined with the current RAB-focussed regulatory framework and greater revenue uncertainty under a more opex-intensive business model, this points towards a preference for capex.
- Does not appear that incentives are always balanced.
  - Different biases may prevail at different times. The modelled opex bias is weaker than the modelled capex bias
  - Complex interactions between incentive mechanisms increases the risk of unintended outcomes.
- Under separate opex and capex incentive mechanisms, there is **no simple fix** to equalise incentives in all circumstances.

Questions

- Do stakeholders agree with our conclusions on the more qualitative factors?
- Are there other qualitative factors that should be considered?

QUESTIONS