



Energy Transition Investment Confidence

Mapping UK Government Decision- Making and Tracking Delivery

UKERC Working Paper

Kirsty Hamilton, Specialist

August 2023



Acknowledgements and Background

This work originated under the UK Energy Research Centre energy infrastructure investment theme. Modelling and analysis of the electricity sector contracts for difference (CfD) regime illustrated the intersection of risk, cost of capital and overall cost of policies during the 'build phase' of the energy transition.^{1,2,3}

It is part of a body of implementation-focused work by the author over two decades, working with senior finance practitioners at the nexus of policy and finance from around 2004, largely on live '**investment grade**' **policy conditions**⁴ driving the early years of renewable energy growth. Post financial-crisis, the author went on to lead the policy work of the Low Carbon Finance Group of senior energy financiers and investors on Electricity Market Reform process, EMR, throughout the design of contracts for difference, CfD, regime from a renewables starting point (2010-2015).

Post-EMR, attention evolved to look at '**investment confidence**' for **policymakers** - how investment-related factors are analysed in underlying decision-making in a transparent way, including the potential to utilize risk-based, financial sector tools and processes⁵. This is a dynamic time - the ecosystem of investors is expanding as opportunities at different scales emerge, including local and community level.

Now a decade on from EMR, this work started out as an update to a short interview-based review of project investment tracking in 2018-2019⁶.

The author would like to thank UKERC and especially Will Blyth, Project Lead, alongside others that provided valuable feedback and helped to shape up the ever-expanding tome.

[Kirsty Hamilton](#) was awarded an OBE for services to green energy, finance and climate change in the New Year Honours list 2020/2021.

¹ UKERC, November 2021 'Risk and Investment in zero carbon electricity systems, implications for policy design'; Will Blyth, Rob Gross, et al. Available from URL: <https://ukerc.ac.uk/publications/zero-carbon-electricity/>

² UKERC, April 2022, 'Pot Zero': Can existing renewables and nuclear help keep prices down this winter?', Rob Gross, Callum MacIver, Will Blyth. Available from URL: <https://ukerc.ac.uk/publications/can-renewables-help-keep-bills-down/>

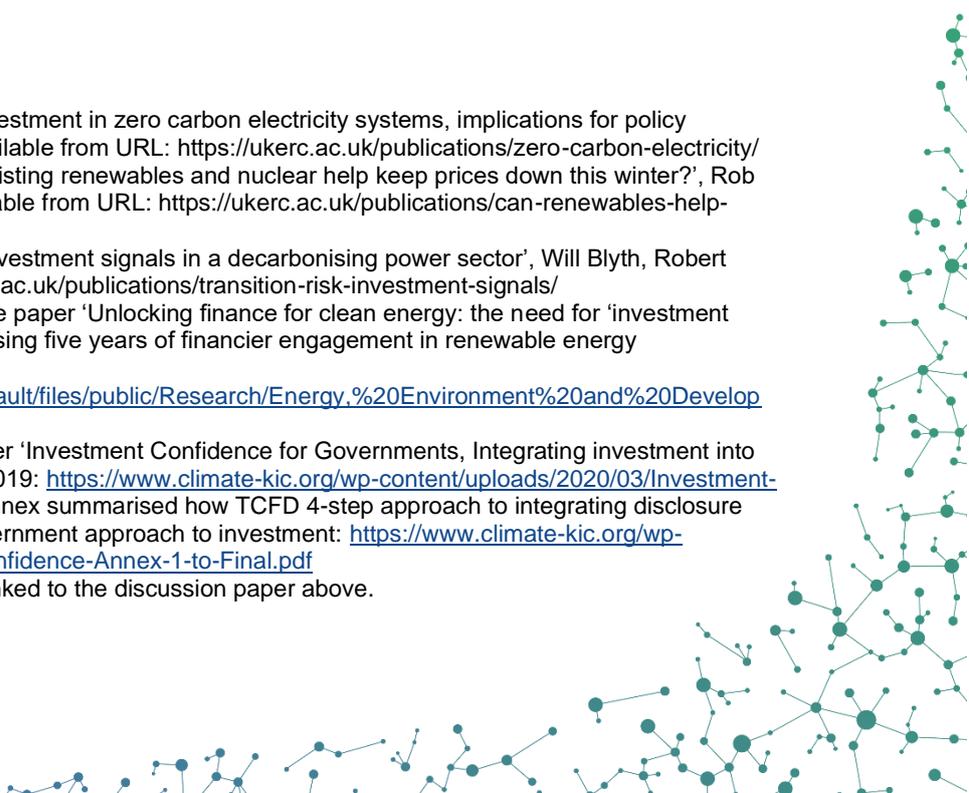
³ UKERC, May 2023, 'Transition Risk: investment signals in a decarbonising power sector', Will Blyth, Robert Gross et al. Available from: <https://ukerc.ac.uk/publications/transition-risk-investment-signals/>

⁴ The author produced a Chatham House paper 'Unlocking finance for clean energy: the need for 'investment grade' policy', December 2009, synthesising five years of financier engagement in renewable energy policymaking. Available from URL:

https://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/1209pp_hamilton.pdf

⁵ The author produced a discussion paper 'Investment Confidence for Governments, Integrating investment into Climate-related Policymaking', August 2019: <https://www.climate-kic.org/wp-content/uploads/2020/03/Investment-Confidence-Hamilton-@2019.pdf>; the Annex summarised how TCFD 4-step approach to integrating disclosure could translate across to a whole of government approach to investment: <https://www.climate-kic.org/wp-content/uploads/2020/03/Investment-Confidence-Annex-1-to-Final.pdf>

⁶ This was preparation for a workshop linked to the discussion paper above.



Introduction to UKERC

The UK Energy Research Centre (UKERC) carries out world-class, interdisciplinary research into sustainable future energy systems.

It is a focal point of UK energy research and a gateway between the UK and the international energy research communities.

Our whole systems research informs UK policy development and research strategy.

UKERC is funded by the UK Research and Innovation, Energy Programme.

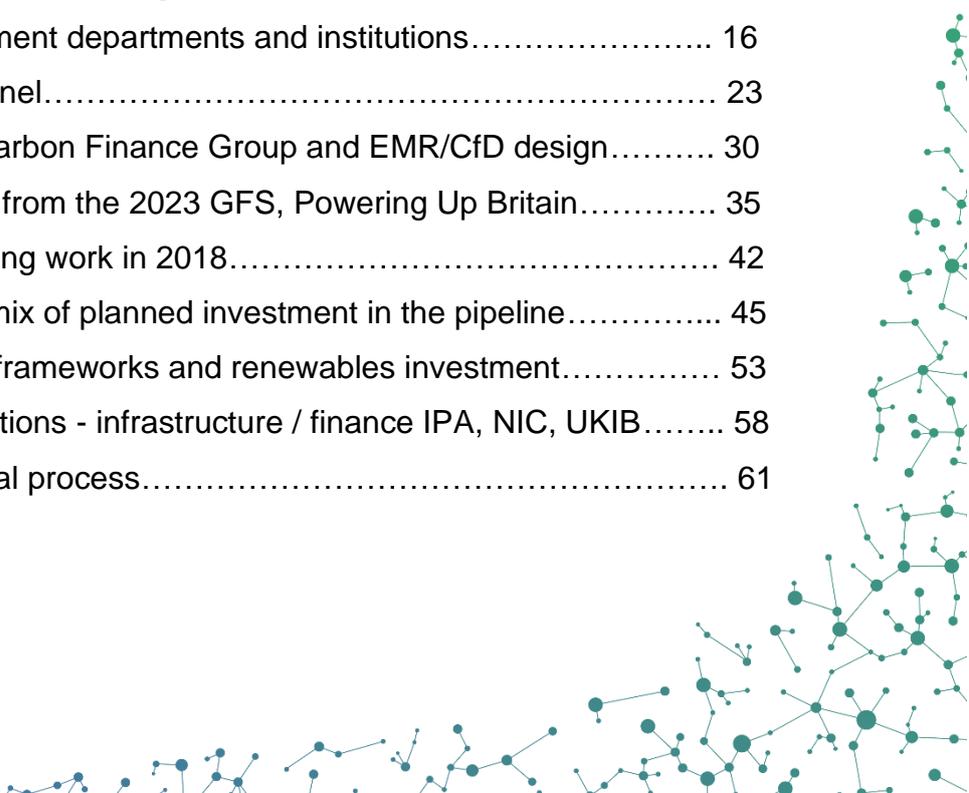


Contents

1. Executive Summary	1
2. Introduction	2
2.1 Investment confidence, starting points	2
3. Summary: Results of Mapping Exercise	5
3.1 Summary observations from mapping exercise	7
3.2 Early warning: the importance of tracking and tracking the right things	10
4. Observations and next steps	21
4.1 Strengthening investment confidence	21
4.2 Next steps toward an ‘Investment Grade’ Delivery Plan	23
ANNEX 1. Mapping of Departments and Institutions	24
A.1 Department for Energy Security and Net Zero (DESNZ)	24
A.2 Infrastructure and Projects Authority (IPA) & Government Major Projects Portfolio (GMPP)	39
A.3 Low Carbon Contracts Company	46
A.4 Department for Business and Trade (DBT)	48
A.5 HM Treasury	52
A.6 Other institutional work	64
ANNEX 2. Checklist – Issues Arising	67

List of Figures and Tables

Figure 1. The case for risk based tracking	12
Table 1. Summary of government departments and institutions	16
Box 1. Establish an expert panel	23
Box A1. Engagement: Low Carbon Finance Group and EMR/CfD design	30
Box A2. Investment numbers from the 2023 GFS, Powering Up Britain	35
Box A3. Review of IPA mapping work in 2018	42
Box A4. IPA Chart: Funding mix of planned investment in the pipeline	45
Box A5. HMT budget control frameworks and renewables investment	53
Table A1. HMT-related institutions - infrastructure / finance IPA, NIC, UKIB	58
Box A6. Green book appraisal process	61



1. Executive Summary

The UK is not on track to deliver climate and energy objectives at the pace required. This paper focuses on private investment and set out to map the mechanics of how the government secures an 'investment grade' delivery plan and knows that this is *on track* to be successful where policy models rely on this.

Increased urgency around implementation, notable gaps in energy infrastructure and a context of greater competition for capital for the needed transition is focusing attention on getting this right. This requires both leadership and the tools for the job.

The review takes desk-based look at six government departments and bodies at how they analyse the 'investment quality' of plans and track if those are working to bring in the investment assumed. It draws on extensive work with financiers and investors on the design of contracts for difference (CfDs) during Electricity Market Reform (EMR) to analyse findings and highlight areas for further attention.

This is not only about confidence for the ecosystem of investors but also investment confidence for policymakers and the public that plans are in place and going to deliver and on a basis that is seen as fair.

Key findings include:

- Gaps: there is a matrix of different teams with in-house investment expertise and there is project-level tracking across some renewables and heat. Yet substantial gaps in infrastructure, inadequate pace, and concern about a looming investment gap suggest that processes are not working.
- Coordination or overlap? A lack of clarity on co-ordination of and coherence between departmental approaches to investment and plans to attract investment.
- Transparency: this appears inconsistent or limited on assumptions, processes and risk assessments, including insights from investor or sector taskforces.
- Tracking: unclear approaches to a systematic 'early warning' if investment is not arising as assumed, at an investment-relevant level of detail that enables course correction.

Key recommendations: an investment grade delivery plan

- Set up a practitioner-focused panel to review factors and tools to build investment confidence, reduce delivery risk and increase transparency.
- Establish forward-focused, risk-based tracking to identify investment-related barriers to implementation in advance as a dynamic part of securing delivery.

Next steps

- The working level paper will be sent to key decision-makers and parties in this area for feedback; on this basis a workshop session will be developed to discuss findings and consider further steps.

2. Introduction

2.1 Investment confidence, starting points

'The role of finance is at the heart of progress in all the main sectors', CCC (2022)⁷

"I urge the Government to regroup on Net Zero and commit to bolder delivery"
CCC (2023), outgoing Chair, Lord Deben.⁸

The need to mobilise and track private investment⁹ for clean energy infrastructure and climate actions is well recognised. However, a looming investment shortfall in the UK¹⁰, grid and network bottlenecks, an official view that an electricity decarbonisation strategy is lacking and renewables implementation is too slow highlight that underlying processes have not been working to secure the investment needed.

Building on extensive engagement between financiers and policymakers during the design of contracts for difference (CfDs) regime a decade ago, the question arises: why are there still gaps between policy goals and delivery?

Creating 'investment confidence', is not just for the ecosystem of investors but for policymakers themselves and the public – confidence that existing plans and any new market or ownership models will deliver, and do so in a transparent way to build trust and public confidence at the same time.

How to get there may be as important as new policy ideas as this is an underlying condition for further scale and course correction.

"0-60"

Closing the gap between headline aims and operational realities is one axis for accelerating action. This was described as "0-60" during EMR¹¹. It referred to how quickly investors start deploying capital in a new (or evolving) regime, borrowing from the vehicle acceleration metric.

The initial focus of this work was **power sector infrastructure** but there is wider relevance to 'net zero' as investment and investment for climate resilience are cross-cutting themes.

This discussion paper sought to delve into the mechanics, mapping how investment-related factors are assessed now in decision-making¹² across departments and

⁷ The Committee on Climate Change, 2022 Progress Report to Parliament, June 2022, page 472. Available from URL: <https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/>

⁸ The Committee on Climate Change, 28 June 2023, at the launch of the 2023 Progress Report to Parliament, 28 June 2023; both via URL: <https://www.theccc.org.uk/2023/06/28/better-transparency-is-no-substitute-for-real-delivery/>

⁹ In this paper investment is used widely to mean the providers of capital (debt, equity) across scales.

¹⁰ Energy UK, 'Storms Approaching: How to prevent an investment hiatus in UK low-carbon generation', February 2023. Available via URL: <https://www.energy-uk.org.uk/index.php/media-and-campaigns/press-releases/552-2023/8425-uk-falling-behind-in-race-for-clean-energy-investment.html>

¹¹ Submission to the first EMR consultation from the Low Carbon Finance Group, March 2011 (from author).

¹² Policy is used as shorthand for all the tools of government including regulation, fiscal and public finance.

institutions during policy design, alongside a focus on how investment data is tracked so corrective action can be taken, in advance?

Track record, but not on track

There is a track record of policy implementation, some ongoing monitoring and renewable energy growth achieved through the contract for difference (CfD) regime¹³ with substantial new goals for OSW and solar¹⁴. This is at a time of significant system transformation involving intersecting areas such as green heating, demand-side and efficiency, storage, wider electrification and accelerating the green hydrogen development. Indeed, UKERC describes this as the *'build phase'* of the energy transition¹⁵.

However, at the start of 2023 the National Audit Office (NAO) assessment of the power sector raised the flag, stating that *'there is no portfolio wide view of the top risks to decarbonising the power sector'*¹⁶. NAO identified both the need for a detailed delivery plan, and *'a set of system-wide measures to track progress and costs to enable [DESNZ] to identify when it is off-track against expectations'*¹⁷.

The lack of urgency on climate and the need for a far stronger focus on delivery was the over-arching theme¹⁸ from the independent Committee on Climate Change (CCC). The CCC reiterated the need for an overarching power sector decarbonisation plan ('overdue') in its mid-2023 Progress Report while downgrading renewables progress as the pace of implementation is too slow.

The Government's 'Powering up Britain' package (PuB)¹⁹, including an updated green finance strategy (GFS), and stated that its policies and ambitions across sectors will 'help leverage' around £100 billion of private investment.

The package, in particular the GFS, outlines a number of elements intended to secure this, including:

- Investor roadmaps;
- A new business and investor forum, the 'Net Zero Council';
- A 'Landscape of Climate Finance';

¹³ For example, BEIS 'Contracts for Difference and Capacity Market Scheme Update 2022', Section 'Key Progress Since the 2021 Update', paragraph 3. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1125343/cfd-cm-scheme-update-2022.pdf

¹⁴ NAO (2023); DESNZ (2023) Energy Security Plan, for example a five-fold increase in solar to 70GW by 2035.

¹⁵ UKERC (2023) 'Transition Risk' April 2023.

¹⁶ National Audit Office (NAO), 'Decarbonising the Power Sector', March 2023, paragraph 2.27, page 40. Available from URL: <https://www.nao.org.uk/reports/decarbonising-the-power-sector/>. The NAO is UK's independent public spending watchdog and supports Parliament 'to hold the government to account'. It audits the financial accounts of all government departments and public bodies and value for money on spending.

¹⁷ NAO (2023), 'Decarbonising the Power Sector', Summary, page 9.

¹⁸ The CCC (2023), Progress Report to Parliament.

¹⁹ DESNZ 'Powering Up Britain' package, 30 March 2023, includes the 'Net Zero Growth Plan' and the 'Energy Security Plan': Available from URL: <https://www.gov.uk/government/publications/powering-up-britain>; In parallel, 'Mobilising Green Investment, 2023 Green Finance Strategy', 30 March 2023. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147377/mobilising-green-investment-2023-green-finance-strategy.pdf

- Targeted public finance;
- A review of attracting foreign direct investment (FDI) to the UK;
- Supporting Local Authority action; and
- Reiterating the 2021 commitment to “*better track private investment into the net zero economy going forward.*”²⁰

In parallel, the energy security plan²¹ outlines sector-level policy approaches: these will be material for investors and financiers. This includes:

- Specific goals for scaling renewable energy, hydrogen, storage and nuclear;
- The Review of Electricity Market Arrangements (REMA) with an extended remit to configure the power market for the future and deliver investor confidence;
- The ongoing development of a Future System Operator (FSO) with a lead role in system strategy and network planning function;
- A number of taskforces and appointment of sector Champions and an Electricity Network Commissioner (to provide specialist inputs and insight²²).

Will this add up?

The question remains: will this or indeed any new package add up to an ‘investment grade’ delivery plan where there is a need to attract investment and at pace? Importantly, how will the government know if not?

Structure of briefing

The discussion paper is not a review of policy, rather it describes the results of a **desk-based** mapping exercise focused on how policymakers currently:

- Assess the ‘investment quality’ of policy developments;
- Track investment-related data and insight to monitor whether policies are ‘on track to deliver’ (i.e. forward looking) or if there are barriers to investment;
- Ensure transparency to enable contestability and to build public trust.

A summary of findings and a summary table are presented in the next section, including observations and questions arising. The short concluding section raises elements for further examination. The main content of departmental review is included in **Annex 1**, and a checklist of questions and issues is in **Annex 2**.

²⁰ DESNZ (2023) 2023 Green Finance Strategy, page 75, paragraph 17.

²¹ DESNZ (2023) Energy Security Plan.

²² A report from the independent Electricity Networks Commissioner is due mid-2023. The appointed ‘Champions’ for hydrogen and offshore wind published their respective independent reports in March 2023. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1144529/hydrogen-champion-report.pdf and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1148888/independent-report-of-the-offshore-wind-champion.pdf.

3. Summary: Results of Mapping Exercise

Departments and institutions

Those included have a core role relating to clean energy or infrastructure finance and investment. New departmental names are used although the main research period (Q3 and Q4 2022 with some update at end Q1 2023) was under the previous iterations²³.

Terms: ‘policy’ is used to mean all the levers available to government, including public finance. A fairly wide-angle approach to ‘investors’ is also used, i.e. the ecosystem of potential capital providers, from large financial investors to small local or community models.

Desk-based: a starting point

A desk-based exercise was undertaken, recognising this is a complex area and there are multiple institutional layers and intersecting elements in the decision-making process, not least the Treasury’s Green Book underpinning departmental processes, or the actual extent of the IPA’s role as a ‘centre of excellence’. This working paper is therefore a starting point, noting that a desk-based approach, by definition, will lack nuance.

The National Audit Office (NAO)’s 2023 report on power sector decarbonisation²⁴ adds critical detail on governance layers within Department of Energy Security and Net Zero (DESNZ) between power sector policy and implementation that were difficult to access online.

The original intent was a short interview-based update of investment tracking from 2018-2019 but as those proved difficult an online approach was taken²⁵.

²³ Footnotes remain in departmental names when documents were viewed: BEIS, DIT.

²⁴ National Audit Office (NAO) ‘Decarbonising the Power Sector, Department for Energy Security and Net Zero’, 1 March 2023.

²⁵ This was largely desk-based due to energy market, political and wider conditions in H2, 2022 constrained interview access to relevant officials in departments or institutions. The original intent was to do an update of an earlier short interview-based mapping exercise ahead of a workshop in 2018 across financier and investor engagement, policy processes, tracking and green finance, contributing to discussion paper Hamilton (2019) ‘Investment Confidence for Governments, Integrating investment into Climate-related Policymaking’, URL: <https://www.climate-kic.org/insights/investment-confidence-for-governments-ensuring-climate-policy-attracts-capital/>

Not included

The mapping does not cover the regulated part of the electricity market where **Ofgem**, the lead regulator, has a central role in securing investment and investor engagement occurs (the cross-regulators body, the **UK Regulators Network**, is also not included²⁶). Ofgem is a critical actor for grid and distribution network infrastructure and the operation of the electricity market. However, ultimately securing delivery of energy and climate objectives rests with government and devolved administrations.. Also not included:

- The **Future System Operator (FSO)**²⁷, under development, is not covered in any detail, although it is noted given its intended central role in the electricity sector.

Other **investment-relevant institutions** not included but that engage with private investors include Crown Estate; Planning Inspectorate; UKRI (innovation-related); Scottish National Investment Bank (SNIB); the Development Bank of Wales; the Scottish Futures Trust and others in Devolved Administrations.

Nor is there institutional detail on **Local Authorities** and **Metro Mayors** and related organisations that have a central role in local infrastructure planning and area-based delivery. This includes the interface with local communities, including local and regional-scale funding and schemes focused on individual actions, community energy models²⁸ as well as larger scale plans. Local government actors have critical insights on planning and investment in the context of what falls inside their jurisdictional powers²⁹.

These institutions would usefully be involved in an expert review panel.

The independent, specialist expertise of the **Green Finance Institute (GFI)**³⁰ is of particular note but also not covered in detail as a non-government entity.

Other intersecting energy related institutions on the oil and gas side are also not included³¹. Confidence in the climate driver in policy means a consistent approach needs to be seen not only towards increasing green energy and intersecting sectors (renewables, heat, efficiency, transport etc) but also out of fossil fuel use and development.

²⁶ UK Regulators Network comprises 13 sector regulators. Among other things it does cross-cutting analytic work, including on the methodology for setting the cost of capital. URL <https://ukrn.org.uk>

²⁷ FSO outline: <https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/future-system-operation-fso>

²⁸ For example, Ripple Energy, <https://rippleenergy.com>; local funding and community shareholding models e.g. communityenergy.london; Green Finance Community Hub, Cumbria <https://greenfinancecommunityhub.co.uk>.

²⁹ For example, the author looked at documents published by the Association of Directors of Environment, Economy, Planning & Transport (ADEPT), an organisation of sub-national 'directors of place' (England) amongst others but was not able to do justice to the subject in this work. URL: <https://www.adeptnet.org.uk>

³⁰ For the latest GFI priorities and stakeholder work please see <https://www.greenfinanceinstitute.co.uk/>. At the time of research the GFI was not involved in tracking investment per se, nor in all policy areas.

³¹ The oil, gas and carbon storage regulator, the North Sea Transition Authority is not included. It 'regulates and influences' the oil, gas and carbon storage industries and has a stated objective of involvement in the energy security, net zero debate and the 'orderly transition' to renewables. Nor is the new 'delivery agency', Great British Nuclear, established in 2023 and which raises the issue of how some parts of delivery get institutionalised and others not (nuclear in contrast to, say, demand-side and energy efficiency retrofit in buildings).

NSTA: <https://www.nstauthority.co.uk/news-publications/some-highlights-from-the-first-12-months-of-nsta/>. The arm's length delivery agency

3.1 Summary observations from mapping exercise

Overview

- There is a matrix of different teams with in-house finance and commercial experience in government departments, although the extent and availability of this capacity is not fully clear.
- There are institutional cross-cutting bodies at Ministerial, senior officials' level and contextual efforts to embed 'net zero' in decision-making in departments.
- There is a level of real-time project tracking in selected technology and investment areas.

Lack of clarity: Co-ordination or overlap?

- Several government institutions have a stated role in mobilising and/or understanding barriers to investment. The level of co-ordination, sharing and publication of market insight and data, on a systematic basis is not clear.
- Nor is it obvious if there is a single co-ordinating body across government.
- The relative role of institutions and the engagement forums needs to be clarified.
- As a core part of implementation, public financial institutions are starting to collaborate with each other on green finance and sustainability. Their role as 'trusted advisors' to government, alongside other bodies, also needs to be integrated.

'Investment grade' policy: work to do as competition for capital for the green transition ramps up

- There is recognition in Powering up Britain of the importance of 'long-term policy certainty and agile and smart regulation' to drive investment and promote confidence. However, '*the devil is in the detail*'³² is a common refrain as investors look for confidence in what implementation will mean in practice as well as over-arching direction.
- A level of finance and investment practitioner engagement is occurring (or being established) during policy design/review through multiple forums or roles across departments and institutions (some independent, some Ministerial-led)³³. This is one avenue for accessing insight on the details that matter for the ecosystem of investors. However, this in turn raises questions:

³² Author observation: this was frequently cited by financiers involved in the Low Carbon Finance Group during engagement on Electricity Market Reform (EMR) process. Clarity over the drivers of policy and confidence that these will outlast changes in government (cross-party consensus) are also important.

³³ A report from the independent Electricity Networks Commissioner is due mid-2023. The appointed 'Champions' for hydrogen and offshore wind published their respective independent reports in March 2023. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1144529/hydro-gen-champion-report.pdf and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1148888/indep

- Transparency: publication of the assumptions, insights or emerging conclusions drawn *during* the engagement process is inconsistent or lacking yet is key for transparency and contestability.
- Process: how is engagement integrated into the policy-related decisions or broader 'sector pathways': lead, follow or weave-in?
- Is there a, standardised 'investment assessment' into which insight is used and does this intersect with other analytic or appraisal approaches (e.g. outlined in HMT's Green Book).
- Are risks to delivery identified during engagement (with sources for data) to feed through into a dashboard for tracking?
- Coherence and clarity: are policies in different energy areas pulling in the same direction or conflicting? This underpins confidence in drivers, priorities and outcomes and how trade-offs may be dealt with (economic, decarbonisation, cost-reduction expectations, distributional impact, affordability, 'fairness' etc.). This is even more critical as frameworks in other countries may appear clearer and more attractive.

Tracking: what is occurring

- There is individual project tracking and some programme tracking, notably:
 - Renewables, heat networks and some specific technologies at defined project scales through Planning Databases;
 - The Low Carbon Contracts Company (LCCC) dashboards covering real-time market activity in the contract areas they manage;
 - Projects and programmes on the Government Major Project Portfolio (GMPP) are also tracked against delivery risks and published (with exemptions).
- It is not clear from a desk-based approach what the trigger is between the project tracking that is occurring and policy review or adjustment.

Tracking - more to do: sharpening up on data, metrics and an outcome-driven use-case

- Data: it is not clear what type of investment data is being accessed and tracked in relation to specific policies and, critically, whether this is linked to analysis of investment-related barriers to implementation. Nor is the relationship with Department for Business and Trade (DBT)'s inward investment data tracking clear.
- Use-case? Outsourced analysis, the 'Landscape of Climate Finance' (LCF), will scope tracking methodologies and data gaps. However, the use-case for the LCF is not clearly stated so it is unclear how, or even *if*, this information will be relevant to implementation.
- Risk-based: critically, it is not clear if there is risk-based analysis in place or being developed to understand whether investment is 'on track' (forward-

[endent-report-of-the-offshore-wind-champion.pdf](#). Other Taskforces include on Solar and Energy Efficiency as well as the Net Zero Council (renamed from the Net Zero Business and Investment Group in GFS 2023).

looking) – an ‘early warning’ if investment barriers or risks identified during policy development are arising.

- Streamlining: the effectiveness of current tracking processes noted above will benefit from a review to ensure a standardised approach is taken across government, e.g. REPD, LCCC and DBT tracking incoming investment.

System-level gaps and risks

- The ‘Green Book’ rules on policy appraisal and risk assessment cover dependencies between policy areas. However, critical gaps in major system-interdependent areas have occurred, not least grid and network bottlenecks (a known issue for some time³⁴); supply chain issues and constraints are also critical. This suggests assessment processes are not working.
- It is not clear whether robust systems are in place to understand whether this is emerging in other areas and to prevent this occurring again.
- Are current metrics and analytic approaches (qualitative and quantitative) adequate for example in areas such as risk and impact on cost of capital?

Investment confidence and fairness

Practical mechanisms to dock-in investment factors with just transition and fairness in delivering goals are not assessed here. However, this is an essential basis for a long-term, lower risk, sustainable approach, including for investors, not least as the public will ultimately pay for the investment (as bill payers or taxpayers and the non-investment, as citizens facing the impacts of climate change).

Transparency and contestability are emphasised as critical to reinforcing this. Contestability enables both the ecosystem of potential investors and wider stakeholders that have a view on investment to engage and contribute different or reinforcing views during developments.

Conditions have to be ‘got right’ such that the wider ecosystem of financiers and investors can deploy capital near term (where this is assumed), but this has to be set with within a wider envelope of science-driven ambition and fairness³⁵ and able to evolve in an agile way as new models emerge, including at local level.

Recommendation: creating an ‘investment grade’ delivery plan

Set up a practitioner-focused panel to review the following areas and set out how to re-calibrate the critical system-level elements in decision-making:

³⁴ Identified in the author’s 2009 report ‘Unlocking Finance for Clean Energy: The Need for ‘Investment Grade’ Policy’, e.g. Programme Paper, page 18. URL <https://chathamhouse.soutron.net/Portal/Public/en-GB/RecordView/Index/152248>

³⁵ For example initiatives to establish benchmark approaches to public engagement around infrastructure projects (Linear Infrastructure Planning Panel – lippanel.org); consultations on community benefits in parts of the electricity system; participatory public engagement and deliberative processes highlighted by the CCC, 2023 Progress Report, page 15 and 335. Local examples in footnote 27 above.

- **Build investment confidence:** what would a standardised and transparent ‘investment assessment’ process look like during policy design (what analytics can help align investor-tier due diligence with policy design?) – is this needed?
- **Reduce delivery risk:** can finance sector risk-based tools, data, analytics or processes help build agile and forward-looking tracking that would highlight emerging challenges and enable course correction?
- **Transparency for three-way investment confidence:** mechanics that build confidence for policy delivery, the financier and investor ecosystem and the wider public are a pre-condition for stronger outcomes, are these in place?

These mechanics and ‘engine design’ elements will only work fully if there is leadership, and a depoliticised, serious and shared agenda.

3.2 Early warning: the importance of tracking and tracking the right things

Tracking and data on whether investment is occurring as assumed by policy models is one of the under-served but essential elements to secure implementation and enable course correction.

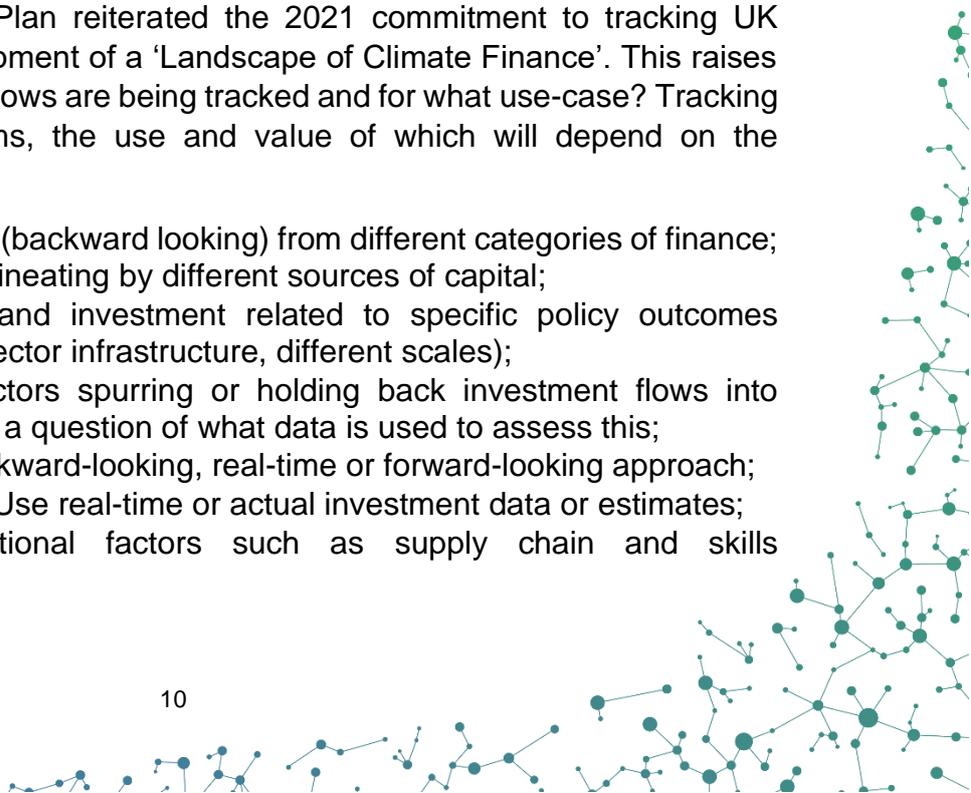
As such this is a dynamic part of delivery directly linked to accelerating actions rather than a technical reporting exercise. One critical challenge in this area is that much of the focus on ‘investment flows’ has been on overall volumes and backward-looking rather than looking ahead.

Forward-focused, risk-based tracking is needed to identify investment-related risks or barriers to implementation in advance.

Financial flows: use-case

The 2023 Net Zero Growth Plan reiterated the 2021 commitment to tracking UK financial flows and the development of a ‘Landscape of Climate Finance’. This raises the question of what financial flows are being tracked and for what use-case? Tracking can take many different forms, the use and value of which will depend on the application, for example:

- Overall flows of capital: (backward looking) from different categories of finance; defining ‘green’ and delineating by different sources of capital;
- Policy-linked: finance and investment related to specific policy outcomes (sector-wide and sub-sector infrastructure, different scales);
- Identifying barriers: factors spurring or holding back investment flows into specific outcomes, with a question of what data is used to assess this;
- Timeframe: Take a backward-looking, real-time or forward-looking approach;
- Real versus modelled: Use real-time or actual investment data or estimates;
- Scope: tracking additional factors such as supply chain and skills development/jobs.



This paper is examining a sharper focus on what drives investment: are policies well designed and *on-track* for bringing in private investment anticipated?

This is less about volumes of capital but understanding and testing initial assumptions and if there are emerging barriers preventing investment occurring, putting at risk existing and future goals. This includes factors relevant to individual investments such as planning, access to infrastructure and supply chain issues or constraints as well as wider conditions.

Tracking overall flows (backward-looking) will not do this directly, nor will a forward approach using estimated investment (e.g. estimated investment in projects) netted against modelled projections of overall capital required. This may be indicative of a 'gap' but will lack real-time detail to provide visibility on corrective action.

Volume of capital vs policy design

At present the connection between modelled volumes of capital required and the complex, increasingly interdependent, sector policy developments is unclear. Not least as seen by those leading developments and deployment of capital on the ground where due diligence is likely to examine policy and market detail.

Where there have been calls for specific '**finance plans**', it is therefore critical to know what is meant (if this is meant to be operationalised) to avoid overlapping silos or gaps. For example, is this about government budgets or everything needed to 'mobilise investment' for which sector-level policy remains central?

Example: EMR's £110 billion: what relevance to policy design?

The author's experience during Electricity Market Reform (EMR) was that the oft-used headline investment of £110 billion needed for electricity generation and transmission at that time³⁶ had very little bearing, if any, on the issues seen by financiers as material during contract for difference (CfD) design. The focus of attention was on the detailed CfD features that impacted the risk profile³⁷, in the context of other factors such as power market structure, access to grid and planning plus the wider investment environment. Confidence in the introduction of the new regime ("0-60") was critical to reduce or avoid a hiatus and jumpstart action.

Lessons from Low Carbon Finance Group (LCFG) engagement is set out in Annex Box A.1 below. Investment numbers included in the PuB documents are in Box 3 below (and further detail in section A.1.5 on Green finance – tracking).

³⁶ For example, DECC, 'Planning our electric future: a White Paper for secure, affordable and low-carbon electricity', July 2011; Executive Summary paragraph 4. This is broken down as £75bn for new electricity generation and £35bn for transmission and distribution (latter number from Ofgem). Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48132/2175-emr-white-paper-exec-summary.pdf

³⁷ For example CfD contract length, contract counterparty, route to market (offtake-related). Wholesale market changes were discussed but not on the table.

UK examples

The case for forward-looking tracking is best illustrated with two specific examples.

1. Post-EMR investment in renewables halved across 2015 – 2017³⁸ and early stage project development plummeted – see Graphic 1 below³⁹. The top green line shows the steep fall in new projects entering planning during this period – this puts the whole pipeline at risk of slowing down substantively. There is a lag before this shows up in projects starting operation, impacting future implementation or course correction.

Figure 1. The case for risk-based tracking – are we *on track*?

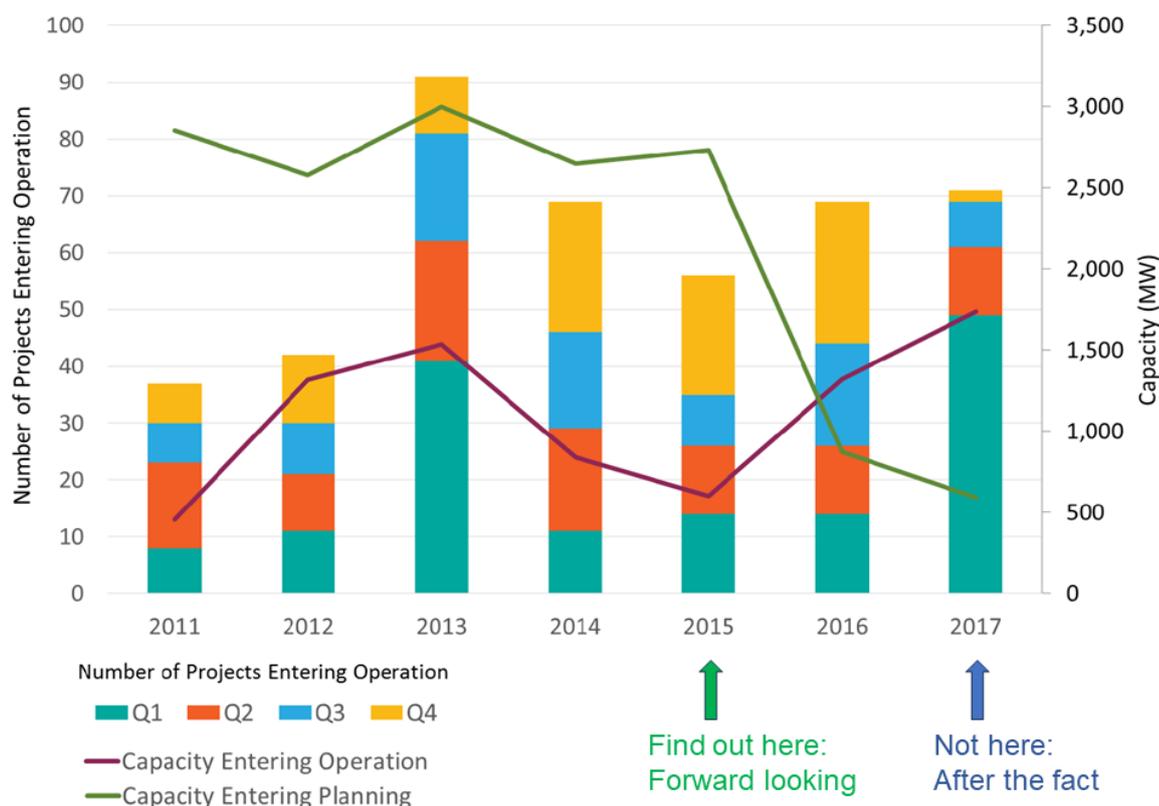


Figure 1 has been adapted from: eunomia 2018. How Data can Inform the Deployment of Renewable Electricity Generating Capacity.

These stark profiles came to light after the fact⁴⁰ and therefore did not offer the opportunity to identify the scale of this pending risk or the chance to take preventative actions, had this impact not been anticipated or intended by policymakers (see Annex A.5.1, Box 6 on the budget management at this time).

³⁸ Bloomberg New Energy Finance, BNEF, “Clean Energy Investment Trends 2017” page 18, slide pack Abraham Louw, 16 Jan 2018 [original graph covers 2004-2017]

³⁹ The graph in the box is from Eunomia Research and Consulting, ‘How Data Can Inform the Deployment of Renewable Electricity Generating Capacity, Using the Renewable Energy Planning Database’, July 2018, Figure 2 ‘The deployment of onshore wind, 2011-17’, page 8.

⁴⁰ The Renewable Energy Project Database (REPD, covered in this working paper) was reporting on project planning during this time but the report from the consultants showing the scale of impact on the early stages of the project pipeline was not completed till 2018.

The lack of advance briefing to investors on any of the budget cuts or changes and the underlying rationale for those was a distinct challenge and increased the overall perception of risk and hiatus (see A.5.1 and Box 6).

2. The importance of real-time assessment is reinforced in reports in Q1 2023 highlighting the risk of a significant forward investment shortfall in the renewable energy investment needed to meet net zero targets. Investor engagement and analysis reported this to be a combination of market conditions and policy and regulatory uncertainty, grid constraints and other factors (see Annex) ^{41,42}.

These examples point to the need for:

- Forward-looking, risk-based investment tracking (data, processes);
- A direct, agile, feedback loop with policy and regulatory design and review processes;
- Strengthened and transparent investor engagement (alongside engagement with other actors required for implementation) able to engage with due diligence-tier issues in the immediate-term as well as longer-term factors.

Tracking comes after the first step: 'investment grade' policy

The multiple moving parts of the energy transition (and indeed intersecting areas like transport and buildings) mean an overall plan needs to be clear. The NAO (2023) and the CCC (2023) both highlight the lack of a credible power-sector plan for decarbonisation.

This paper is not a review of energy policy, rather mapping 'how it is done': is there a standardised and transparent 'Investment Assessment' approach during policy design that aligns with investor-tier due diligence and helps policymakers navigate different views?

Earlier work identified key steps:

- Clarify: the assumptions being made about attracting investment and strengthen the effectiveness of policy package (policy, regulatory, fiscal, public finance) – with a clear analytic approach that aligns with investor due diligence;
- Test: identify risk areas for investors in the policy package (a focus for tracking) through effective engagement;
- Inter-dependence: Identify critical linked or interdependent elements for practical implementation, including infrastructure, supply chain, workforce as well as local community-related factors and resilience.

Some of these elements are implied in HMT's policy appraisal and risk assessment processes but, from a desk-based view, it is not clear exactly how this is applied or

⁴¹ Energy UK (2023), 'Storms Approaching', February 2023). The 'investment-hiatus' scenario projects 54GW shortfall of renewables compared to a 'Net Zero pathway' and £62 billion of 'missing investment' out to 2030.

⁴² Renewable UK, 'Retaining the UK's leadership in renewables', February 2023. This examines UK policy in the context of the U.S. Inflation Reduction Act which is attracting significant international investor interest. Available from URL: <https://www.renewableuk.com/news/632276/Retaining-the-UKs-leadership-in-renewables.htm>

streamlined with, say, cost-benefit analysis or the range of engagement processes underway.

These issues are raised in more detail in the Annex below.

Risk-based analysis and decision-tools being used or developed in the financial sector may also be relevant for policymakers, indeed the author raised some options in earlier work⁴³.

International context

This discussion paper takes a detailed look at approaches to investment in the UK decision-process. However, the relevance goes beyond a single country.

Since the Paris climate agreement there has been considerable focus on the large volumes of 'sustainable finance' required for clean energy, infrastructure and climate actions. In emerging and developing economies (EMDEs) clean energy investment needs to increase seven-fold by 2030, and at global level triple⁴⁴. Meanwhile, policy developments, incentives, industrial strategies in the US and EU are galvanizing investor attention leading to concerns other countries will miss out.

By delving into the 'gearbox' level detail in one specific jurisdiction on elements for an investment-grade delivery plan, it is hoped that this identifies some factors that contribute to the wider exchange on how to connect the world of big modelled investment numbers with on the ground realities in other jurisdictions, each with specific resources and conditions.

This can be challenging as all actors are grappling with the complex realities of scaling renewables, the energy transition, securing energy access in the context of local needs, entrepreneurs, jobs, and sources (and cost) of capital at different scales

There are a number of mission-critical issues not picked up in detail. Not least the important role of public finance institutions in EMDEs⁴⁵ and a set of issues around resilience to climate change.

⁴³ Hamilton (2019)

⁴⁴ International Energy Agency (IEA) publications, 2021, e.g. <https://origin.iea.org/news/it-s-time-to-make-clean-energy-investment-in-emerging-and-developing-economies-a-top-global-priority>

⁴⁵ Link to a view from CEO and Chair of Africa investor Group, Dr Hubert Danso, on 'blended investment', the role of multilateral development banks (MDBs) and EMDE credit risk assessment: <https://africainvestortv.com/dr-hubert-danso-speaks-to-the-net-zero-asset-owner-alliance-at-the-summit-for-a-new-global-financing-pact-2/>

Summary of Table 1 contents

The table below summarises the mapping results including observations and questions arising. It covers:

Actions to track implementation-related investment - to the left of the table

- Coverage: what is tracked
- Entity and periodicity - which entity is doing the tracking and how often
- Observations and questions

Actions to assess investment factors during policy design - to the right of the table:

- What is being done at present
- Observations and questions

Government departments and institutions included:

- Department for Energy Security and Net Zero (DESNZ)
 - project-scale tracking databases
 - DESNZ green finance team and strategy
 - Net Zero Growth Plan
- Infrastructure and Projects Authority (IPA)
 - IPA / DESNZ Government Major Project Portfolio (GMPP) tracking
- Low Carbon Contracts Company
- Department for Business and Trade (DBT)
 - DBT / DESNZ investor road maps
 - DBT / Office for Investment
- HM Treasury (HMT) and its related institutions National Infrastructure Commission (NIC) and UK Infrastructure Bank (UKIB)
 - Budget allocation and policy appraisal (Green Book)
 - Infrastructure
 - Green Finance

Other Institutions: Committee on Climate Change

Table 1. Summary of government departments and institutions: what they are doing

Department or institution	Tracking coverage	Tracking entity & periodicity	Tracking observations (O) & questions (Q)	Investment assessment in policy design	Policy-related observations (O) & questions (Q)
<p>DESNZ Lead department for climate change and energy policy</p> <hr/> <p>DESNZ– Project Scale Renewable Energy Planning Database, REPD</p>	<p>RE electricity projects Over 150kW Project stages:</p> <ul style="list-style-type: none"> • inception • planning • revised application [construction • operation • decommissioning <p>- UK-wide - Interactive map with additional selection criteria</p>	<p>Outsourced to Barbour ABI</p> <p>Quarterly</p>	<p>O: Close to real-time tracking.</p> <p>O: Provides nuance on project pipeline health</p> <p>O: Only covers a certain project range / size (although expanded since start of REPD)</p> <p>Q: What type of real-time investment data is accessed?</p> <p>Q: Do consultants provide an assessment of causes for delays or projects not being taken forward? If so, on what basis? Is this published?</p>	<p>Investment specialists are integrated into individual policy teams and approaches (the Commercial team ceased operation as a separate unit within BEIS in 2020).</p> <p>During policy design, existing tools to access finance and investment input including:</p> <ul style="list-style-type: none"> ○ Setting up industry / investment taskforces; ○ Independent appointed sector Champions or Commissioners; ○ Calls for evidence and formal policy consultations; ○ Engagement, workshops during policy design stages with investors and representative groups; ○ Commissioning financial expertise (e.g. Sizewell C); ○ Access to in-house and institutional expertise: LCCC, DBT, IPA; UKIB; Green Finance Institute. 	<p>Q: Is investment engagement during policy design ad hoc or is there a structured process?</p> <p>Q: How are any differing views arising from investor engagement dealt with; are investment assumptions made by DESNZ transparent & contestable?</p> <p>Q: Do assumptions made about investment and risk areas during policy design feed through to tracking (are sources of data available)?</p> <p>Q: Is there a mechanism between project tracking, implementation and policy review/amendment?</p> <p>Q: What is the role of the Green Finance or private investment mobilisation team at sector level?</p>
<p>DESNZ– Project Scale Heat Networks Planning Database, HNPDP</p>	<p>- Heat networks (HN) deployment - Tracks projects (as per stages under REPD) based on planning applications - UK-wide interactive data map</p>	<p>Outsourced to Barbour ABI</p> <p>Quarterly</p>	<p>- as above</p>		

Table 1 (Continued)

Department or institution	Tracking coverage	Tracking entity & periodicity	Tracking observations (O) & questions (Q)	Investment assessment in policy design	Policy-related observations (O) & questions (Q)
<p>DESNZ– Project Scale</p> <p>Heat Network Project Pipeline and Procurement pipeline</p>	<p>Project Pipeline -Overview of Govt-supported projects - Includes an ‘Active capex pipeline’ - capex data by development stage (corresponding to different support options) - Intends to show heat network investment opportunities - England & Wales</p> <p>Procurement Pipeline - covers upcoming procurement opportunities supported by Government.</p>	<p>DESNZ Quarterly</p> <p>Project Pipeline information: -HN Delivery Unit -HN Investment Project</p> <p>Procurement Pipeline: source info from Heat Network Industry Council & Green Heat Network Fund Transition Scheme</p>	<p>O: The ‘active capex pipeline’ provides actual investment numbers.</p> <p>Q: Were assumptions on the capex pipeline investments identified in advance? And if so, how do the numbers compare?</p>		
<p>DESNZ Net Zero Growth Plan (2023)</p> <p>Governance – delivery and tracking</p>	<p>The 2023 Net Zero Growth Plan re-states commitment to tracking investment flows (as above)</p> <p>Alongside other factors recommends transparent approaches to system-level tracking against expectations.</p>			<p>Governance: Cabinet committee and cross-department senior bodies – leading the integration of net zero into decision-making</p> <p>- Plan to further increase co-ordination and transparency (before end 2024) -Will share detail on tools and processes used in decision-making</p> <p>- Will consider the case for new delivery agencies</p> <p>Future System Operator (FSO) – also anticipated to feed in to policy development.</p> <p>NAO outlines more detailed energy policy governance processes and co-ordination in DESNZ (including elements required).</p>	<p>Q: Given serious bottlenecks arising on grid and network connection – is this framework now adequate? Are there processes for analysing and picking this up?</p> <p>Q: Who should lead on stronger investment-related coordination across HMG?</p> <p>Q: What triggers are in place to escalate attention to potential delivery gaps – systematic or issue by issue (and do all departmental teams include or have access to needed capacity)?</p> <p>Q: What will the role of FSO be, in relation to other entities, for determining delivery of its plans?</p>

Table 1 (Continued)

Department or institution	Tracking coverage	Tracking entity & periodicity	Tracking observations (O) & questions (Q)	Investment assessment in policy design	Policy-related observations (O) & questions (Q)
<p>LCCC</p> <p>Low Carbon Contracts Company</p> <p>Private limited - owned by DESNZ Secretary of State</p> <p>Executes contracts and counterparty for: - Contracts for Difference, CfDs - Capacity Market, CM.</p>	<p>Monitors project implementation against legislated milestones (under CfD & Capacity Market).</p> <p>Transparent investment information linked to auctions.</p> <p>Involved in design and execution of the operational contract management & engage key market players</p> <p>Focus on open data and 'significantly increased' transparency re CfD regime.</p> <p>Plans expanded data publication; actively assesses public benefits against commercial confidentiality.</p>	<p>Real-time, live 'dashboards' - regularly updated for CfD and CM with data & metrics relevant for 'analysts, managers and policy makers'.</p>	<p>Real-time data.</p> <p>Q: How do the LCCC dashboards intersect with the outsourced DESNZ/REPD and associated databases?</p> <p>Q: Is it LCCC or DESNZ that would pick up any emerging unintended consequences or trends?</p>	<p>- Expanding role as in-house specialist advisor on policy and instrument design for investment.</p> <p>Provides expert advice on policy and market design, e.g.:</p> <ul style="list-style-type: none"> - Low Carbon Hydrogen; - Regulated asset base (RAB) model (for nuclear). <p>Incentive schemes getting underway:</p> <ul style="list-style-type: none"> - CCUS for power generators, a 'Dispatchable Power Agreement', DPA, targeting mid-merit order CCGT; - Industrial Carbon Capture Agreement, in planning, targeting energy intensive industries. 	<p>Q: Is the policy role largely on the operational design of instruments or it is seeking a more strategic input (in areas it will not directly manage)?</p> <p>Q: If the latter, how does LCCC intersect with IPA on advisory work?</p>
<p>IPA</p> <p>Infrastructure and Projects Authority</p> <p>- reports to Cabinet Office & Treasury – 'Centre of expertise' on infrastructure – Govt Major Projects Portfolio & database</p>	<p>IPA/DESNZ : DESNZ reports to IPA on a list of major projects (majority are programmes rather than individual projects) under the GMPP. Focus on 'delivery confidence' using traffic light rating.</p> <p>DESNZ GMPP list includes: - Specific funds and funding lines; - Specific projects including CCUS clusters; Sizewell C.</p>	<p>Quarterly data reporting to IPA on GMPP projects.</p> <p>GMPP Annual Report</p> <p>- IPA Annual Infrastructure & Construction Pipeline and Procurement Pipeline</p>	<p>Delivery/implementation focused monitoring.</p> <p>Q: Are the processes for delivery confidence assessment (e.g. 'double red' triggers that result in senior level attention) useful for all policy areas?</p> <p>Q: How is investment data tracked beyond GMPP, including at smaller scale?</p> <p>Q: Is there a link between GMPP projects and Nationally Significant Infrastructure Projects?</p>	<p>IPA Supports:</p> <ul style="list-style-type: none"> - DESNZ on energy policy development - DESNZ/HMT on financial and commercial aspects of business models - IPA conducts or advises assurance reviews if projects/programmes are high risk, GMPP or medium risk (following a Risk Potential Assessment). 	<p>Q: Is IPA's expertise accessible to DESNZ and other government departments <i>on-demand</i>?</p> <p>Or is it expected to be a coordinating body for this?</p> <p>Q: Is there a structured role for IPA interaction with other departmental entities e.g. Office for Investment (OFI)? Or investment stakeholder groups set up by government?</p>

Table 1 (Continued)

Department or institution	Tracking coverage	Tracking entity & periodicity	Tracking observations (O) & questions (Q)	Investment assessment in policy design	Policy-related observations (O) & questions (Q)
<p>DBT</p> <p>Department for Business & Trade</p> <p>- Supports/monitors UK inward and outward investment.</p> <p>- Office for Investment (OFI) a joint DBT & No.10 unit</p>	<p>DBT tracks foreign direct investment into the UK.</p> <p>OFI - tracks barriers to inward investment against investment priorities (see policy column).</p> <p>Investment Council (IC) set up in 2021 to provide global investor insight to DBT and wider government.</p>	<p>Annual</p> <p>IC – meets twice yearly or as needed</p>	<p>Q: How does market insight and information feed through to other departments?</p> <p>Q: Is the DBT approach to commercial confidentiality (FDI tracking) the same as that used by other government institutions? Or able to inform that?</p> <p>Q: How does the FDI tracking intersect with sector delivery tracking?</p>	<p>*Review of attracting FDI (April to Sept 2023) DBT, OFI, HMT – priority sectors in TOR include ‘green technologies’.</p> <p>OFI: - ‘Single front door’ joint unit to support high value investment into the UK, – engages with inward investors, intent to ‘resolve barriers’ to top tier investments. Has internal finance expertise.</p> <p>OFI role, for example, in DESNZ Hydrogen Sector strategy and policy.</p>	<p>Q: DBT and also OFI: is there a mechanism for exchange between DBT/OFI and other departments on market insight or issues?</p> <p>Q: What is the trigger for a ‘high value investment’ with regards to gaining OFI / senior attention (e.g. size or need?)</p> <p>Q: How does the IC fit with other inputs (e.g. OFI or NZBIG)? Are there plans to publish IC insights (non-attributed)?</p>
<p>DBT / DESNZ</p> <p>Investment Roadmaps: - CCUS - Hydrogen - Automotive (EV +) - Energy</p> <p>UK supply chain</p>				<p>- Additional and updated sector-level Investment Roadmaps (adding to H2, CCS and Automotive) providing an above-the-canopy <u>policy</u> overview aimed at the investment community. - Includes focus on supply chain and policy development timeframes. - Also engagement with DESNZ and market players on UK supply chain development.</p>	<p>Q: What stage of investment decision-making are these Roadmaps intended to inform?</p> <p>Q: Do Roadmaps contain the level of detail investors need from this type of document? [This Q is now flagged in 2023 GFS]</p> <p>Q: Are Roadmaps linked to delivery objectives?</p>
<p>HMT</p> <p>Treasury executes budget allocation to departments for policy implementation</p> <p>- Infrastructure role: facilitating private investment</p> <p>- Green finance role: green bond issuance</p>	<p>* Green Book - on policy appraisal – central to budget allocation (see policy column)</p> <p>* Associated institutions -National Infrastructure Commission (NIC) -UK Infrastructure Bank</p> <p>-Monitoring approach in Green & Magenta Books (as flagged in National Infrastructure Strategy)</p>	<p>HMT Annual spending review</p> <p>Annual NIC Infrastructure Progress Review</p> <p>Five-yearly NIC Infrastructure Assessment (due 2023)</p> <p>UKIB Annual Report</p>	<p>Q: HMT tracks budget spending (departmental) but how does it track private investment (or policy implementation) against economic growth assumptions?</p>	<p>* OFI (see DBT above) review of attracting FDI reports to Chancellor.</p> <p>Green Book – central guidance for departments on how to appraise and evaluate policies and projects.</p> <p>HMT has infrastructure and Green Financing roles. The latter involves issuing sovereign green bonds and allocating the monies to specific policy areas.</p> <p>Published a Net Zero Review exploring key issues and trade-offs, October 2021.</p>	<p>Q: How does HMT analyse trade-offs between investment risk, cost and value? Or is that assumed to be within proposals?</p> <p>O: Gaps are evident in the real economy (notably grid infrastructure and network dependencies). This suggests i) gaps in Green Book; ii) threats to future option of strengthening goals?</p>

Table 1 (Continued)

Department or institution	Tracking coverage	Tracking entity & periodicity	Tracking observations (O) & questions (Q)	Investment assessment in policy design	Policy-related observations (O) & questions (Q)
<p>The CCC</p> <p>Legislated Independent Body</p> <p>Statutory role reporting on progress against carbon budgets</p> <p>Analysis and advice on science, economics and policy.</p>	<p>New monitoring framework (June 2022) influenced NZGP</p> <ul style="list-style-type: none"> - Government department and policy specific - Delivery risk focused (although not assessing barriers to sector investment) - Electricity monitoring indicators/gaps outlined <p>Largely utilises information supplied by existing processes to track progress but can commission work.</p>	<p>Annual report to Parliament on progress</p> <p>Standalone reports (e.g. March 2023 report on electricity sector)</p> <p>Devolved Administrations policy review</p>		<p>2023 Progress Report</p> <ul style="list-style-type: none"> -Strong focus on implementation <p>On power sector, recommendations include:</p> <ul style="list-style-type: none"> - Power sector strategy/plan (with content areas outlined) - Minister-led Infrastructure Delivery Group - Cross-cutting 'enabling' areas 	<p>Request a forward-looking approach to tracking investment-barriers to help get sharpen up an understanding of delivery risk and wider interdependencies.</p> <p>This is not seen as technical reporting but part of a dynamic process that helps accelerate outcomes.</p>

Annex Table A.1 compares the infrastructure focus of the IPA, the UK Infrastructure Bank (UKIB) and the National Infrastructure Commission (NIC).

4. Observations and next steps

4.1 Strengthening investment confidence

The last decade has seen substantial renewable energy cost reductions as a result of well-designed policy and market support, building track record and scale. In turn, this and other factors mean there is now a more diverse and dynamic investment ecosystem with very considerable investor interest across the energy transition and associated infrastructure. Ensuring a just transition and the need to consider climate mitigation and adaptation together are increasingly understood as integral to truly sustainable longer-term investments.

To deliver on 1.5C will need substantial build out of renewables at pace, scaling green heat (still nascent) and actually addressing energy efficiency, building retrofit and demand side flexibility and at the different scales that make up the energy transition.

It is also the ‘opportunity of a lifetime’⁴⁶ for many on the investment side looking at the substantial shifts towards clean energy and out of fossil fuels, implied by the confluence of climate, energy security and energy access goals (large-scale or local / community-level). This is seen in the context of underlying wider headwinds and drivers in which government policy still plays a key leadership role. So it is all to play for.

Investment confidence - all sides

The general characteristics of ‘good’ policy from an investment perspective are now well known: clarity over direction and detail relevant to the sector or sub-sector, a legal basis that outlasts political cycles, all aspects relevant to a deal in place (from permitting, network access, clear market operation and increasingly inter-sectoral factors) a firm legal basis and clear processes for making changes⁴⁷.

‘Investment confidence’ is also an issue for policymakers and the public: will policies work as anticipated to drive the scale-up needed and are they seen to be fair?

Decision-making mechanics need to get to the right level of detail i.e. that aligns with the due diligence process and/or financial models or other tools used by investors. These then need to be tested and tracked in a clear, systematic way. This could help on a number of fronts:

- Depoliticise energy or other sector policy landscapes;
- Reduce delivery risk;

⁴⁶ Sentiment observed by author at the PEI Global Infrastructure Investor Summit, 20-23 March 2023, Berlin.

⁴⁷ Early input to policymakers from the financial sector in 2004 characterised good policy as ‘Loud, Long and Legal’ (Bonn International Renewables Conference, June 2004, financial sector statement – from author).

- Ensure design features work for the ecosystem of potential investors targeted: from large institutional sources of capital and specialist funds to Local Authorities or newer models for community-level or participatory investment;
- Build social licence⁴⁸ and community support. Regimes must work for investors (where that is assumed) but this must sit in a context of transparency and fairness *in order* to be sustainable.

Where are we now?

The questions arising in the mapping exercise are focused on ‘gearbox’ issues for securing practical implementation once overarching goals are set that are ambitious and generate public confidence.

On the government side, compared to a 2018 mapping exercise:

- There is now a matrix of different teams bringing in-house infrastructure, finance and commercial experience to government departments;
- There are institutional cross-cutting bodies at Ministerial, senior officials’ level and contextual efforts to embed ‘net zero’ in decision-making;
- There is a level of real-time project tracking in selected technology and investment areas (DESNZ, LCCC, IPA/GMPP);
- There are multiple different engagement forums in place which can access ‘investor’ input.

However, gaps remain, including:

- Governance and coordination: it is still not clear if there is a systematic approach to designing ‘investment confidence’ into policy and if there is a single coordinating entity for infrastructure / investment;
- Transparency and contestability: outputs from investor engagement processes are inconsistent and at times lacking and not always clear how they fit in to decision-making;
- Early warning: it is not clear what data the government accesses to understand if policies are attracting the investment assumed, or if there are investment-related barriers holding back implementation;
- Complexity and interdependency: these are recognised in HMT appraisal rules⁴⁹, yet this is not happening or not consistently (grid and network connections, a notable example). This relies on inputs based on the right tier of investment-relevant detail.

⁴⁸ Example of substantive work in this area: <https://sustainabilityfirst.org.uk/projects-fair-for-the-future>

⁴⁹ For example the Risk Potential Assessment form, available from <https://www.gov.uk/government/publications/risk-potential-assessment-form>

4.2 Next steps toward an ‘Investment Grade’ Delivery Plan

A desk-based review only sees the tip of the iceberg. Below the surface data, tools and architecture may be in place with adequate in-house capacity - or not – bolstering or undermining the ability to deliver against or strengthen goals.

“Pace must be prioritised over perfection”

The statement from outgoing Chair of the Committee on Climate Change, Lord Deben, reinforces bolder delivery at the launch of its 2023 Progress Report. To secure that pace we must re-wire if not redesign the engine to deliver that in a much more agile and way on the road to 1.5C.

The following is proposed to review the technical aspects and insight needed to re-calibrate to enable speed and course-correction if key systems are not in place. This is seen as a dynamic process creating sharper feedback loops to stay on track.

This only works if the ambition level is set and leadership is there on clear and consistent outcomes. Re-designing the engine is one thing, but won't work if the vehicle is facing the wrong way or the road is fogged or too bumpy to stay on course.

Box 1. Establish an expert panel on investment confidence and climate action

Practitioner expertise from across the ecosystem of finance and investment, lead departmental economists, renewables and energy transition systems, data experts alongside local authority leads and locally-relevant investors.

This is an exercise to ensure there are dynamic, investment-related tools and processes that can help policy makers secure implementation. It is not envisaged as an annual technical reporting exercise.

Decision-architecture – review, if not in place recommend how to:

- **Build investment confidence** – is the ex-ante Investment Assessment for policy and regulatory design adequate (qualitative and quantitative) and clear against goals and priorities; are risk areas identified?
- **Reduce delivery risk** – risk-based tracking: are data, analysis and metrics suitable to determine if policies are on-track to gain the investment assumed;
- **Secure transparency** – build wider policy and public confidence for sustainable outcomes how to navigate commercial confidentiality and develop structured but dynamic engagement with investors and stakeholders to secure delivery;
- **‘Centre of excellence’**: *on-demand capacity* across government departments and local / sub-national level?

Annex 2 below contains a **checklist** of key issues raised in this working paper.

ANNEX 1. Mapping of Departments and Institutions

This more detailed Annex provides the desk-based overview of departments that are linked to energy infrastructure with observations and questions in each section. It is aligned with the summary Table 1 above but contains additional areas.

A.1 Department for Energy Security and Net Zero (DESNZ)

Departmental re-organisation in February 2023 saw former BEIS⁵⁰ department being reconfigured as the Department for Energy Security and Net Zero (DESNZ), the business functions shifted to the trade department. The remit is securing the UK's long-term energy supply, bringing down bills and halving inflation in the context of UK 'seizing the opportunities of net zero'⁵¹.

The 'Powering Up Britain' (PuB) set of documents were published at the end of Q1 2023 updating climate, energy security and green finance plans, among others.

This section starts with project/programme tracking and then looks at green finance, green finance tracking and departmental governance around net zero climate and energy decision-making. Policy design, including the Review of Electricity Market Arrangements, REMA, is under 3.1.3 below and Box A1 highlights CfD financier engagement the what, why, challenges and value-add on each side.

A.1.1 Project-level tracking

Project databases and pipelines

DESNZ monitors projects across renewable energy, energy storage and heat networks through an outsourcing arrangement. This covers:

- Project planning databases⁵²: a regularly updated list of specific projects, over 150kW⁵³;

⁵⁰ Department of Business, Energy and Industrial Strategy, BEIS. The desk-research on departments was done pre-reorganisation.

⁵¹ Government Press release 'PM: Making government deliver for the British people', 7 February 2023. Available from URL: <https://www.gov.uk/government/news/making-government-deliver-for-the-british-people>

⁵² The Renewable Energy Project Database (REPD) records were first published in July 2014 on a monthly basis; this changed to quarterly after September 2018. In January 2021 management of the Database was taken over by Barbour ABI (from Eunomia Research and Consulting). REPD and updates from URL: <https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract>.

⁵³ A DESNZ update (3 August 2022) notes that in January 2021 the size threshold for project tracking reduced from 1MW to 150kW. Author notes that mapping work from 2018/2019 indicated that storage projects were included for the first time from January 2019; the shift from 1MW to 150kW scale projects was also mooted from that date.

- It covers renewable energy, battery and other forms of storage and heat networks⁵⁴;
- Project scale and technologies for inclusion are determined by DESNZ; project size has decreased from 1MW to 150kW since the start of monitoring (meaning smaller projects registered before that time may not be included in the database).
- An interactive project map is available⁵⁵.
- Investment is included for Heat Networks under the Heat Network Project Pipeline and Procurement Pipeline themes.
- The Heat Network Project Pipeline includes capital expenditure data by development stage and investment monitoring includes an 'active capex pipeline' with investment numbers broken breakdown by stage of pipeline⁵⁶.

The outsourced planning database is intended to provide a quarterly, real-time picture of actual projects at different stages of the pipeline: inception, planning, revised application, construction, operation and decommissioning. However, this suggests other areas and scales are not included in this type of monitoring.

The original 2014 description of the databases shows that the assessment is cross-referenced with sector entities and organisations, including Renewable-UK, the sector trade association.

Observations/Questions

- The planning databases and pipeline tracking create a good backdrop for understanding the health and robustness of the forward project pipeline in some detail. A negative impact or hiatus in early project stages flows through to fewer opportunities for investment in later stages and is therefore a critical issue and provides early warning if policy goals (including future options to strengthen goals) may be at risk.
- There is a published excel overview of individual projects but do the consultants provide an assessment of barriers⁵⁷? If so, on what basis? The 2014 explanation of the renewables database says: "*these data help identify where problems may be occurring in policy, incentive mechanisms and in the planning process*"⁵⁸. However, it is not easy to find out if there is separate analysis commissioned on this or who actually does this.
- It is not clear, from a desk-based review exactly how this data is used by DESNZ: is there a standard regular review process that enables this data to feed into, or trigger, policy review or amendment? How does this identify system or 'dependency' areas such as grid connection adequacy (or supply chain

⁵⁴ Heat network projects were included from April 2021.

⁵⁵ This is available from Consultants Barbour ABI. It offers additional selection criteria to the REPD database. Available from URL <https://data.barbour-abi.com/smart-map/repd/beis/?type=repd>

⁵⁶ For example DESNZ, 'Heat Networks: 2022 Q4 Pipeline', page 4. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1150488/heat-networks-project-pipeline-oct-dec-q4-2022.pdf

⁵⁷ REPD monthly extract from April 2023 is the latest viewed, available from URL:

<https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract>

⁵⁸ BEIS, 'The Planning System for Renewables', March 2014, page 1. The document is described as: 'An explanation of the renewables planning database'. From: <https://www.gov.uk/government/publications/the-planning-system-for-renewables>

constraints, costs or workforce factors) if material to delays moving along the pipeline?

- Were assumptions on the ‘active capex’ pipeline for heat networks identified in advance. If so, how did numbers compare to the actual investments. Are there lessons arising that are relevant for other segments?
- A further question is whether this real-time tracking will be expanded to include other areas currently not covered and how ‘innovation’ areas are assessed?
- Not reviewed here, but EV charging infrastructure is another area that should be being tracked and may offer insight.
- See also green finance tracking, section A.1.5 below.

A.1.2 DESNZ / Government Major Project Portfolio (GMPP)

DESNZ monitors and reports on both projects and programmes that it is responsible for under the Government Major Project Portfolio (GMPP) led by the Infrastructure and Projects Authority, IPA. In 2022-23 DESNZ had 19 projects⁵⁹, funds or programmes under the GMPP, down from 23 in 2022. (See IPA / DESNZ section 3.2.2 below).

A.1.3 Investment factors in policy design – in-house capacity and engagement

The question at the outset is where policy development processes are intended to influence investment, is there a consistent approach to analysing the ‘investment quality’ of the policy design. A clear process could increase confidence in navigating information from the finance and investment community and help officials standardise approaches. This may be something that is occurring or is provided by the IPA, for example, but this is not clear.

Commercial team

A preliminary mapping exercise in 2018 identified the importance of ‘Commercial Team’ as a core unit providing in-house finance sector expertise, notably expanding in the aftermath of the financial crisis during the Electricity Market Reform process (2011-2015). Commercial team developed peer-to-peer financial sector engagement both assessing market information to inform policy development and providing timely direct investor briefings on policy developments⁶⁰. Commercial Team was disbanded as a separate unit in 2020 and, as understood, in-house expertise became integrated across policy areas.

⁵⁹ The IPA 2022-2023 Annual Report 20 July 2023, released at time of publication of this briefing, notes DESNZ leads 19 projects. URL <https://www.gov.uk/government/publications/infrastructure-and-projects-authority-annual-report-2022-23> (p 14). The data used in this Annual Report is based on that submitted to the IPA in March 2022 (p 40).

⁶⁰ The author had extensive engagement with Commercial team throughout the EMR process as the policy lead for the Low Carbon Finance Group (LCFG) and viewed the build-out of this team, then in DECC, as one of the successes of the EMR period.

Observations/Questions

- Is internal capacity adequate or otherwise co-ordinated (see also question on IPA expertise)? Are DESNZ and/or IPA in-house expertise available on demand across departments for different policy areas?
- As Commercial Team expanded it was not always clear what read-out it was making from finance and wider investor engagement. This could have helped investors and stakeholders better understand the underlying assumptions and drivers being used by government in policy development. This would also have aided contestability, to enable challenges, reinforcement or a wider set of views to the read-out being made: of value to both sides.

Accessing investment insight: multiple taskforces and forums

DESNZ uses an expanding range of informal and formal market/investor engagement methods, alongside calls-for-evidence and consultations, to provide feedback/input on investment-related factors during implementation or policy design, or to set strategy. These include:

- Jointly developed Sector Deals e.g. Offshore Wind Sector Deal negotiated in 2019⁶¹;
- Establishing specialist industry Taskforces/Councils, including investment expertise, for example, the Net Zero Council, Energy Efficiency Taskforce and Solar Taskforce⁶²;
- Appointing independent sector ‘Champions’, e.g. the appointment of an Offshore Wind Champion (May 2022)⁶³ and a Hydrogen Champion (July 2022)⁶⁴, both reporting in Q1 2023;
- Appointing an Electricity Networks Commissioner⁶⁵ reporting on accelerating the delivery of the right network infrastructure, an issue material to investors;
- Commissioned work from finance experts and consultants;
- Workshops involving investors during policy design;
- Access to in-house expertise - departmental and related institutions, for example, IPA, DBT, LCCC, UKIB, SNIB, Green Finance Institute.

⁶¹ Offshore Wind Sector Deal one year on, March 2020: <https://www.gov.uk/government/publications/offshore-wind-sector-deal/offshore-wind-sector-deal-one-year-on#background>

⁶² For example, in 2023, an Energy Efficiency Taskforce and a government/industry Solar Taskforce outlined in the PuB Energy Security Plan (DESNZ 2023, page 22 and 34 respectively). Further descriptions at: <https://www.gov.uk/government/groups/energy-efficiency-taskforce>, <https://www.gov.uk/government/groups/solar-taskforce>

⁶³ Press Release: ‘Offshore Wind Champion appointed as £160m floating offshore wind fund opens for expressions of interest’, 20 May 2022. Available from URL: <https://www.gov.uk/government/news/offshore-wind-champion-appointed-as-160m-floating-offshore-wind-fund-opens-for-expressions-of-interest>

⁶⁴ Press Release: ‘Hydrogen Champion appointed as government accelerates UK hydrogen investment’, 22 July 2022. Available from URL: <https://www.gov.uk/government/news/hydrogen-champion-appointed-as-government-accelerates-uk-hydrogen-investment>

⁶⁵ Press Release: <https://www.gov.uk/government/news/new-electricity-networks-commissioner-appointed-to-help-ensure-home-grown-energy-for-britain>

Transparency

A cursory look at several forums indicate this is inconsistent and in some cases lacking.

For example, the EE and Solar Taskforces publish single-page minutes of which half a page is the list of participants⁶⁶; there is one press release for the initial ‘launch’ meeting of the Net Zero Investment Council. This makes it impossible for external inputs or any contestability from those not directly participating (unless invited). With some contrast the Scottish government’s Net Zero Investor Panel gives a reasonable level of information into the type of content discussed. No minutes appear to have been published for the DBT Investment Council (see A.4.3 below). REMA, see below, has stronger transparency around its two main stakeholder forums.

Observations/Questions

- To what extent are these engagement tools used systematically or in a standardised or consistent basis across policy areas? Are they practitioner focused?
- Transparency, is there a best practice approach being developed?
- How does experience of the earlier sector deals e.g. offshore wind, compare with the model used by the newer Taskforces e.g. energy efficiency and solar as working arrangements between government and sector?
- How representative are the invitees of diversity in the sector – across any given constituency; are smaller entities adequately represented?
- Are departmental legal teams, involved in contracting, also a source of insight on risk?
- There is a wider question on where capacity lies. A line of sight in where the gaps are is one benefit from reviewing this more thoroughly.
- See also A 1.7 below on Energy Sector Governance

Investor Confidence: REMA

The Review of Electricity Market Arrangements (REMA), launched in 2022, has an explicit focus on investor confidence in the sector⁶⁷ recognising that there is “*a strong case for a market design that minimises investor risk, to reduce financing costs and allow construction of renewable assets to be realised at least cost.*”⁶⁸

⁶⁶ Solar and energy efficiency taskforces: <https://www.gov.uk/government/groups/solar-taskforce#notes-of-meetings>; <https://www.gov.uk/government/groups/energy-efficiency-taskforce#notes-of-meetings>; Net Zero Investment Council Press Release: <https://www.gov.uk/government/news/government-holds-first-net-zero-council>; Scottish Government Net Zero Investor Panel: <https://www.gov.scot/publications/net-zero-investor-panel-minutes-march-2023/>
<https://www.gov.scot/publications/net-zero-investor-panel-minutes-december-2022/>

⁶⁷ BEIS, ‘Review of Electricity Market Arrangements, Consultation document’ July 2022. See for example, Executive Summary (page 9) and Chapter 3, on criteria (page 46).

⁶⁸ BEIS, ‘Review of Electricity Market Arrangements, Consultation document’ July 2022. Section on ‘Minimising financing cost and maximising operational signals’, page 55.

Evidence on “*relative benefits of lower financing costs and more efficient system operation*” and policy design factors that influence those, will be central to decisions given complexities and trade-offs⁶⁹. It will build on work from CfD development⁷⁰.

Engagement with investors is being developed⁷¹.

Specialist stakeholder forums (Market Participants, End-Users) have been set up with a good degree of transparency and circulation to an opt-in stakeholder distribution list, noting the issues raised and with an open offer of meetings.

Observations/Questions

- Experience of Low Carbon Finance Group (LCFG) engagement during EMR may offer some insight for REMA (see Box A1 below).
- What is the analytic base for how REMA process will assess financing costs and trade-offs? An engagement process with investment practitioners will enable both input and testing of options.
- Is answering the question of ‘investor confidence’ for REMA a cross-government question that can apply to, or inform other areas of policy?

⁶⁹ BEIS (2022), REMA consultation document, page 56.

⁷⁰ The author and the Low Carbon Finance Group (shared interest in renewable energy) were directly engaged in the CfD regime development to bring finance practitioner insight on key design features of the regime, as well as over-arching finance sector factors.

⁷¹ DESNZ circulates outputs from the REMA Market Participant and End-User forums on a REMA stakeholder list which is open to any interested parties to join. The author talked to REMA officials on investor engagement.

Box A1. Engagement: Low Carbon Finance Group and EMR / CfD design

Low Carbon Finance Group was a first-of-its-kind group of leading senior energy finance practitioners (debt and equity) with a common interest in renewable energy (RE). Founded in 2010, post financial crisis, its aim was to be a focal point to help policymakers factually understand conditions to scale greater investment in clean energy. There was a gap between policy development starting points and investor due diligence / decision making processes. The following are the author's observations from this engagement:

The Electricity Market Reform (EMR) process was a primary focus (2011-2015). LCFG's practical engagement included:

- Lead EMR officials: regular update briefings and identification of key areas of risk in CfD policy development. More limited engagement with Treasury and Infrastructure UK (a precursor to IPA) - the latter was the initial link with HMT.
- Ministerial level: Energy Minister twice a year or as required on wider market conditions and exchange on strategic issues; Commercial Secretary to the Treasury.
- Structured input to EMR consultations and Parliamentary Inquiries (including submissions and oral evidence). Additional input included:
 - a written briefing on cost of capital from a finance perspective;
 - a financial modelling exercise, with assumptions book, to illustrate how different policy elements interacted with investment decisions (arising in context of HMT questions on optimal CfD contract length); and
 - LCFG member participation on DECC "Steering Boards"
- Beyond UK: wider policy and market development (RE and early energy transition): practitioner input and exchange with EU; 'feeding up' on-the-ground implementation and policy experience into specific international fora, including the UK hosting the Clean Energy Ministerial with a finance focus⁷².

Observations / some of the lessons learned

The gap or why it was needed

- Financiers leading RE transactions understood the internal boxes that needed ticked by credit and investment committees, key risk factors and the role of policy in that context as well as the broader drivers or barriers influencing appetite for assets.
- Different analytic starting points between policymakers and financiers, including modelled economic efficiency vs risk in a due diligence context; economic modelling vs financial models (assumptions book); understanding of risk and cost of capital.

⁷² LCFG organised two CEM finance roundtables between Minister's and renewables/energy efficiency finance practitioners and a produced a 'State of the Market' briefing (2012, available from author).

Box A1 (Continued)

Features that made it work

- Value-add to both sides: investors look for exchange/visibility on both detail of policy developments and longer-term drivers of the government approach in the context of how decisions are getting made. This can contribute to investor confidence and reduced the time to understand the new regime (“0-60”);
- Effective engagement format: DECC Commercial team underpinned a senior-level ‘peer-to-peer’ approach to practitioner engagement that helped build more effective exchange; this is one of a number of observations on the practical format for accessing insight;
- Involvement of a cross section of finance and investment practitioners - an ecosystem rather than a one or two token financiers in a multi-stakeholder context. This meant that different risk appetites and other factors across the investment community could be teased out ‘in situ’, rather than leaving policymakers to navigate. As size of opportunities, models and focus (e.g. local, impact) changes, the ecosystem of capital providers is enlarging.
- Recognition that practitioners are not same as trade-associations and may not have time to read policy documents or write submissions, therefore direct engagement on specific questions was essential in a suitable format.

Challenges

- Confidence on the policy side: confidence in calibrating what is a real risk or barrier, as outlined by financiers, versus self-serving? Transparent engagement and appropriate analytic base should help navigate this;
 - In reality, issues raised by financiers resulted in HMG commissioning consultancy work to provide backing and confidence to policymakers that issues were real, especially where assumptions on economic efficiency did not line up with risk perception on the finance side.
- Confidence on the financing side:
 - Clarity and confidence in the government ‘takeaways’ from meetings; observing that each community tended to ask, answer and prioritise questions and responses differently;
 - Clarity on priorities and underlying assumptions in various parts of the HMG policy analysis, especially where there were multiple objectives (political or other) often lumped together. As observed, the reality was often multiple small hierarchies on different issues.
- Treasury (HMT): HMT analysis was described as a ‘**black box**’; an early briefing and exchange on their analytics and processes would have been beneficial. For example, sporadic publication of modelling assumptions; analysis in trade-off areas: including value-for-money and consistency between technologies (differing cost reduction expectations on renewables and nuclear, for example). [see Box 6: HMT budget control frameworks].
- Post-EMR cuts: the structured engagement during CfD policy design was not matched during the budget cutting process significantly undermining confidence (reflected in Graphic 1 above). Policies do not have to be rigid but clear processes for change are essential (as is grandfathering for this reason).

Box A1 (Continued)

Post-EMR – the question of how to embed what LCFG brought to CfD design into decision-making (where there is an expectation of private investment) led to this current work, with early suggested steps:

- Clarify investment assumptions in initial analysis (and basis for assumptions)
- Test through transparent, structured engagement
- Back with stronger in-house capacity (across-government)
- Clear processes, metrics and analytics needed (qualitative and quantitative) – to depoliticise and for transparency
- Agile ability to understand and respond to unanticipated sector or wider challenges.

A.1.4 Green Finance Strategy

The government's first Green Finance Strategy was published in July 2019, with an update in early 2023. The genesis of the government's focus on 'green finance' was the post-Paris Green Finance Initiative: a collaboration between HM Treasury, the Department of Energy and Climate Change, and the City of London as co-ordinator of an appointed fixed set of experts. The initial focus was on capital markets and building out London's international role as a global green financial centre, not least capturing the burgeoning green bond market.

The Government's subsequent 2019 Green Finance Strategy (GFS)⁷³ was structured around both 'greening finance' and 'financing green' with a primary focus on the former: re-orienting the overall financial sector and the supply of capital to factor in longer-term risk issues and also opportunities. It led to the launch of the Green Finance Institute (GFI) to foster collaborations to address barriers in the real economy⁷⁴. GFI is independent and determines its own priorities for attention although works alongside government on agreed areas and receives some funding.

The link between work on green or sustainable finance as a *separate* topic and sector policy (the 'financing green' part) has not always been clear, leading to a risk of silo'ing, disjointed overlap or gaps. Investors generally invest because opportunities work in the context of investment mandates with an acceptable risk and return. Sector goals, pathways and policy details play a central role in that risk/return equation, as evident in the CfD example.

Although the focus of the 2023 GFS Update⁷⁵ remains on shifts in the financial sector it usefully signposts to the sector-level sections of the 'Powering Up Britain' (PuB)

⁷³ BEIS, 'Green Finance Strategy, Transforming Finance for a Greener Future', July 2019.

⁷⁴ BEIS (2019) Green Finance Strategy, page 48. See also Green Finance Institute, <https://www.greenfinanceinstitute.co.uk>. As outlined in the 2023 GFS, DESNZ will work with GFS on a forward-looking analysis of blended finance models and how they could be used in the UK (page 90).

⁷⁵ DESNZ 'Mobilising Green Investment, 2023 Green Finance Strategy', 30 March 2023.

package. It also states that the PuB policies and ambitions ‘*will help leverage around £100 billion of private investment*’⁷⁶.

The primary stated aim of the overall GFS package, however, is to communicate to investors and the finance sector the UK’s intent ‘*to grow green investment across all parts of the UK – setting a clear direction, creating investment opportunities and providing a comprehensive framework of government support.*’⁷⁷

In the Investment chapter the GFS:

- Reinforces the ‘critical role’ of central government, public finance institutions and local authorities (LAs) in providing funding, incentives and ‘*the right policy frameworks and signals*’.
- Signposts that other parts of the PuB package for the detail of how ‘*policy, regulatory and funding levers*’ will provide investor confidence (sectoral and whole-economy)⁷⁸.
- Indicates that an expanded set of sector-level ‘investment roadmaps’ (see A.4.5 below) and the set of UK public finance institutions are also key parts of the architecture.
- Tracking private investment as a means to monitor progress is also a priority with a Landscape of Climate Finance commissioned⁷⁹ (see A.1.5 below).

Observations/Questions

- The list above is a mixed bag, see section A.4.5 for questions on Investment Roadmaps, for example.
- Landscape of Climate Finance and Investment Roadmaps and observations are covered under A 1.5 below.
- Is the DESNZ GF team or another entity in a coordination role bringing together all the factors noted in the GFS for mobilising investment?
- Are Local Authorities able to access ‘in-house’ or other finance expertise on demand given their central role in implementation?

A.1.5 Green finance – tracking

Of particular relevance to the tracking part of this review, the 2023GFS restates the commitment in the 2021 Net Zero Strategy to “...*to better track private investment into the net zero economy going forward.*”⁸⁰, working with external partners and data providers.

The NAO’s 2023 review of decarbonisation in the power sector also observed that DESNZ had ‘*not yet established a set of system-wide measures to track progress and*

⁷⁶ DESNZ (2023) Green Finance Strategy, page 69.

⁷⁷ DESNZ (2023) Green Finance Strategy, page 69.

⁷⁸ DESNZ (2023) Green Finance Strategy, page 75, paragraphs 19 and 20.

⁷⁹ DESNZ (2023) Green Finance Strategy, page 75, Box 16.

⁸⁰ DESNZ (2023) Green Finance Strategy, page 75 paragraph 17, quoting original BEIS ‘Net Zero Strategy, Build Back Greener’, October 2021 Chapter 4, page 223, paragraph 26.

costs, which could enable it to identify when it is off-track against expectations⁸¹. This was reiterated by the CCC more broadly for Net Zero⁸².

UK Landscape of Climate Finance

A 'UK Landscape of Climate Finance' has been commissioned, 'to build the evidence base on green investment flows in the UK from public and private sources of finance into net zero sectors'⁸³. This is slated to conclude in summer 2023. Key features are to:

- Scope 'existing investment tracking methodologies and evaluate available data sources';
- Develop a pilot 'Landscape of Climate Finance' (LCF) model;
- Identify key data gaps which need addressed;
- Contribute to DESNZ commitment to investigate 'how we apply a systematic and robust approach to tracking annual investment flows'.

Observations/Questions

- As per introduction, a critical question is the **use-case for investment flows work** and therefore what tier of detail is relevant and able to be accessed?

Further Observations: from project tracking to financial flows – use-case, metrics and gaps

- The REPD project stages (see A 1.1 Project-level tracking, above) provides important detail on the early stages of the pipeline. However, this leads to a question of metrics and how any intent to produce an 'investment gap' number has relevance for securing implementation? This gets to the heart of the use-case for investment flows.
- A modelled overall sector investment assumption and then a further set of assumptions translating, for example, the REPD project pipeline into investment numbers does produce an investment gap number⁸⁴. However, this is not the same as getting to the actual finance and investment and project development-linked detail to identify actual barriers and to tackle those directly.
- The author's own experience is that the project-level tier of detail also needs complemented by understanding the broader drivers or headwinds (factors that may create hurdles): energy and financial sector trends influencing appetite and decisions. Not least as many sources of capital are mobile, in the context of shifting opportunities and geopolitics.

⁸¹ NAO (2023) Summary, paragraph 13, page 9.

⁸² CCC 2023 Progress Report, page 336.

⁸³ DESNZ (2023) Green Finance Strategy, page 75, paragraph 18 and box 16. Note that DESNZ has also commissioned external work on options to track private investment into nature.

⁸⁴ Detailed project level work by Frontier Economics is a useful case of what this approach does and does not do: 'The UK's Net-Zero Investment Gaps, a report for E3G and WWF', September 2022. Available via URL <https://www.frontier-economics.com/uk/en/news-and-articles/news/news-article-i9800-the-uk-s-net-zero-investment-gap-a-short-report-for-e3g-and-wwf/> (press release, 9 Nov 2022).

Box A2. Investment numbers from the 2023 GFS, Powering up Britain and related documents

Needed or anticipated results (forward-looking)

* **£100 billion** – amount of private finance leveraged through the PuB ambitions and policies ‘over the period to 2030’

Source: PuB overview document, page 6 – no specific reference for data source; 2023GFS, page 69.

* Decarbonising the power sector, with 60% increase in demand, has potential to ‘bring forward’ **£275-375 billion** of public and private investment by mid next decade.

Source: Net Zero Growth Plan, page 27, footnote 20 indicates this is from internal DESNZ analysis based on DDM model reference case 22.

* Investment in the **electricity network: to bring forward £50 – 150 billion** of investment by 2037.

Source: Net Zero Growth Plan, page 27, footnote 21 indicates this derives from electricity networks modelling, section 3.2, Electricity networks strategic framework. Carbon Budget Delivery Plan, Appendix F, page 186.

* **Needed: an additional £50-60 billion of capital investment each year** to deliver on the UK’s net zero ambitions, through the late 2020s and 2030s most of which will need to come from the private sector.

Source: originally in the 2021 Net Zero Strategy [2023GFS, page 73; footnote references p.49 of the 2021 NZS].

One infrastructure investor said on these numbers: “*The key focus for investors is on delivery and granular details as to how the government’s interim net-zero targets will be met.*”⁸⁵

Question: beyond year-on-year comparisons, how can these numbers materially help with implementation?

Actual (backward-looking)

* **UK exports increased an estimated 67% 2020-2021** from the low carbon and renewable energy sectors (compared to a 6% increase in total exports in the same period).

Source: GFS Executive Summary

* **Over £50 billion 2021-2022** of new low carbon investment (public and private) in the UK. Annual investment in low carbon sectors more than doubling in real terms over the past five years – a ‘step change’

Source: 2023GFS page 11, paragraph 16. Footnote 13 states this is DESNZ analysis of BNEF data. It indicates the set of energy-related technologies covered includes ‘power, energy storage, transport, heating, hydrogen, and CCS’, describing this as a ‘conservative estimate’ as it does not represent all low carbon sectors.

Alternative numbers have been published but difficult to compare, illustrating the challenge of data and use-case⁸⁶.

⁸⁵ Aviva ‘The Outlook for UK Infrastructure’ 6 January 2022 <https://www.avivainvestors.com/en-gb/views/aiq-investment-thinking/2022/01/uk-infrastructure/>

⁸⁶ The Guardian reported that research by the House of Commons Library indicates that from 2021 to 2022 investment in the ‘energy transition’ fell by 10% from \$31 billion to \$28 billion (“UK investment in clean energy transition falls 10%, bucking global trend”, 27 April 2023. Available from URL:

Box A2 (continued)

* **£23 billion in 2022** of new low carbon investment (public and private) in the UK
Source: 2023GFS page 18 paragraph 7. Footnote 19 indicates this is DESNZ analysis of BNEF data, as above.

* **UK had second highest amount of cumulative low carbon investment in Europe** over last five years

Source: DESNZ Powering Up Britain overview document, page 9, footnote DESNZ analysis of BNEF 'Energy transition investment dataset'.

A.1.6 Cross-government governance

As investment and transparency are cross-cutting themes, the question arises which institution is responsible in the context of governance around energy, net zero, private investor relationships and public budgets.

Senior-level, cross-department decision making arrangements both for net zero and sectors are outlined in the 2023 Net Zero Growth Plan (NZGP) and earlier documents⁸⁷:

- Cabinet-level: the 'Domestic and Economic Affairs (Energy, Climate and Net Zero)' Committee covers '*matters relating to energy, and to the delivery of the United Kingdom's domestic and international climate strategy*'⁸⁸;
- A Climate Non-Executive Board Members Liaison Forum, to draw on the expertise of non-executive board members from across Whitehall;
- A new Net Zero Council (originally the Net Zero Business and Investment Group) which will convene business and finance leaders⁸⁹;
- A Local Net Zero Forum as a 'single and coordinated' engagement route for 'strategic local net zero policy and delivery issues.

The 2021 Net Zero Strategy had noted:

- A cross-departmental officials' group, at Director-General level; and
- A bimonthly Net Zero, Energy and Climate Change Inter-Ministerial group with Devolved Administration Ministers (some relevant powers and policies are devolved, others are not); supported by an officials-level Net Zero Nations Board.

<https://www.theguardian.com/environment/2023/apr/27/uk-investment-in-clean-energy-transition-falls-10-bucking-global-trend>; research commissioned by the Liberal Democrats). The article indicates that this includes renewable energy, electric vehicles, electrified heat such as heat pumps, hydrogen, energy storage and carbon capture and storage. The source of the data is not clear in the reporting. BNEF data analysed by DESNZ appears to include transport; the DESNZ number for 2022 is £23 billion whereas the HoC Library number appears to be £28 billion (from the Guardian story). More critical would be the detail of the underlying cause(s) of a year-on-year fall.

⁸⁷ DESNZ (2023) Net Zero Growth Plan, 'Embedding Net Zero in Government', page 104.

⁸⁸ List of Cabinet Committees, updated at 14 March 2023. Available from URL: <https://www.gov.uk/government/publications/the-cabinet-committees-system-and-list-of-cabinet-committees/list-of-cabinet-committees-and-their-membership#domestic-and-economic-affairs-energy-climate-and-net-zero>. Note that under the previous 'Climate Action' committee set-up, the Prime Minister chaired one of two Committees. The Domestic and Economic Affairs (Energy, Climate and Net Zero) Committee is chaired by the Secretary of State to the Cabinet office with the DESNZ Secretary of State as deputy chair.

⁸⁹ The first meeting of the Net Zero Council took place on May 2023. See URL: <https://www.gov.uk/government/news/government-holds-first-net-zero-council>

Earlier recommendations for over-arching department-level coordination (unclear status) include:

- HM Treasury (2021 Net Zero Review) proposed a co-ordinating cross-department 'Climate Board' (see section 3.5.5 below); and
- The independent 2023 Net Zero Review, led by Rt Hon Chris Skidmore, proposed a new Office for Net Zero Delivery to facilitate complex, cross-cutting outcomes, including to:
 - Provide a clear point of contact for investors and a clear strategic view across the investment landscape
 - Work in partnership with IPA, UKIB and NAO to advise on best delivery practice.⁹⁰
 - In addition, the CCC proposed a Minister-led Infrastructure Delivery Group in its mid-2023 Progress Report.

In part in response to some of the recommendations above and from the Committee on Climate Change around the transparency of internal government processes, the 2023 Net Zero Growth Plan includes a list of governance methods it will use:⁹¹

- Embed 'systems tools and practices to support cross-sector decision making' and account for dependencies;
- Publish a map of the governance landscape as part of sharing further detail on tools and process used in decisions and policy-making;
- Consider the case for new 'delivery agencies' ('Great British Nuclear' is the example of what is meant by this type of agency, it is being established in 2023; in contrast energy efficiency has a taskforce);
- Improve the quality and coverage of data in decision-making, and ensure climate and environmental impacts are considered in all fiscal decisions, as priorities; HM Treasury will continue to work with departments on climate impact assessment capability.

Observations/Questions

- Points above appear useful, it is hoped there will be an opportunity to engage on these themes.
- The author's 2018/2019 work in this area led to a proposal to form a taskforce Clean-energy or Climate-related finance for Governments (TCFG - equivalent to the TCFD at the time) bringing finance and investment practitioners, lead government economists and departmental experts and stakeholders for an exchange across – governance, strategy, risk management and monitoring⁹².

A.1.7 Energy sector governance

It is challenging to understand sector governance via a desk-based review, however the NAO's review of decarbonising the power sector sets out DESNZ governance. The

⁹⁰ Rt Hon Chris Skidmore MP, 'Mission Zero, Independent Review of Net Zero', 13 January 2023, page 51. From URL:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128689/mission-zero-independent-review.pdf

⁹¹ DESNZ (2023) Net Zero Growth Plan, pages 104-105.

⁹² Hamilton (2019)

NAO also emphasised the requirement for ‘*substantial investment*’ in new capacity and ‘*system-wide modernisation*’ and the need for ‘*a joined-up approach to ensure changes happen in sequence and with coherence*’⁹³.

DESNZ energy sector governance arrangements⁹⁴ comprise

- An energy board
- An energy portfolio office
- A resourcing group (wider than energy)

The energy board provides coordination across three departmental groups (markets and supply; energy infrastructure; net zero and nuclear). The energy board feeds in to ‘*wider net zero governance and boards*’.

The energy portfolio office provides support to the Board with a remit to provide ‘*an overview of the sector, lead and oversee plans for power sector decarbonisation*’ including providing ‘*progress updates, monitoring and risk information*’.⁹⁵ The energy portfolio office can escalate significant risks for review, however, the NAO notes there is currently no portfolio-wide view of the top risks to decarbonising the sector⁹⁶.

In terms of adequate resourcing, DESNZ has established ‘*a resourcing group to help move resources between DESNZ and other public bodies to prioritise activities and fill net zero roles*’⁹⁷.

The DESNZ structures will also receive input from a range of government-established, independent industry stakeholder taskforces, working groups, sector champions (hydrogen, offshore wind), commissioner roles or initiatives - in play, planned or been used in the past in specific areas (also referenced A 1.3 above). These include:

- An Electricity Networks Commissioner, reporting mid-2023, with a core focus on halving network development time for transmission networks. DESNZ will produce an Action Plan in response to the recommendations anticipating that ‘*substantial changes*’ are likely to be needed⁹⁸;
- A senior-level Energy Efficiency Taskforce with Ministerial co-chair⁹⁹. The remit includes assessing barriers and opportunities in current market and regulatory arrangements.

⁹³ NAO (2023) Summary page 10, paragraph 16.

⁹⁴ NAO (2023) outline of DESNZ sector level governance, pages 31-33.

⁹⁵ NAO (2023) page 31.

⁹⁶ NAO (2023).

⁹⁷ NAO (2023) Summary, paragraph 14, page 9. More detail is provided in paragraph 2.32, page 41: the DESNZ permanent secretary has the ability to move resources between groups and director generals can move resource between directorates. The Resourcing Group has been set up ‘to ensure that net zero roles can be filled with the right funding and skills’ and partner organisations, presumably outside DESNZ, will be requested to contribute to energy priorities with resources.

⁹⁸ Electricity Commissioner Appointment announcement, July 2022, <https://www.gov.uk/government/news/new-electricity-networks-commissioner-appointed-to-help-ensure-home-grown-energy-for-britain>. More detail is now available on the Commissioner’s approach and eight themes that will be addressed: DESNZ (2023) Energy Security Plan ‘Power networks, interconnection and system governance’ section, from page 45.

⁹⁹ Announced by the Chancellor in the November 2022 Autumn Statement <https://www.gov.uk/government/publications/energy-efficiency-taskforce-terms-of-reference/energy-efficiency-taskforce-terms-of-reference>. Disclosure: the author is on an independent Scottish Government Green Heat Finance Taskforce running from January 2022 to September 2023.

- Solar government/industry taskforce on ground-mounted and rooftop solar¹⁰⁰ to identify actions needed by government and industry in the context of a target five-fold increase in the sector.

In the face of ‘*increasing integration and complexity in the energy landscape*’ a new entity in the governance landscape – the Future System Operator (FSO)¹⁰¹ is being created. It is intended to advise on policy decisions¹⁰² or as officially described it is a central body ‘*able to weigh up and advise on the impacts and trade-offs across vectors and plan from a whole systems perspective*’¹⁰³. This will be instituted and create its first Centralised Strategic Network Plan by 2025¹⁰⁴. Detailed transition planning from the current situation is underway and further consultations will take place.

Meanwhile, the CCC’s 2023 Progress Report recommends a Minister-led infrastructure delivery group.

Observations/Questions

- Capacity: should *on-demand* in-house finance capacity (DESNZ, IPA etc.) be assumed at the base of Energy Governance structure?
- The NAO notes the *linkage between a clear delivery plan and minimising investor cost of capital*¹⁰⁵ and therefore the cost of decarbonisation. Understanding the policy-related factors that raise risk and contribute to increased cost of capital is a key area.
- Expert groups can provide essential insight into this and practical implementation realities, but their role in decision-making also needs to be clear. ‘Leadership and accountability’ is one sub-heading in the Energy Efficiency Taskforce TOR. This paper has not examined the TOR of all of these bodies, however, the author’s own experience of seeking to input to one (as well as being on one) is that it can be difficult to engage, not least if secretariat functions are additional to a busy day job. Minutes of some meetings are published but often not in a format or detail that enables further input during the process.

A.2 Infrastructure and Projects Authority (IPA) & Government Major Projects Portfolio (GMPP)

The Infrastructure & Projects Authority (IPA) reports to the Cabinet Office and HM Treasury (HMT) and is the Government’s ‘*centre of expertise*’ for infrastructure and

¹⁰⁰ DESNZ (2023) Energy Security Plan, page 34.

¹⁰¹ Government press release 6 April 2022, URL <https://www.gov.uk/government/news/government-future-proofs-britains-energy-system-with-launch-of-new-body-to-boost-energy-resilience>; Ofgem overview: <https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/future-system-operation-fso>; development is underway at time of writing.

¹⁰² NAO (2023) Summary page 9.

¹⁰³ DESNZ (2023) Energy Security Plan, page 46.

¹⁰⁴ DESNZ (2023) Energy Security Plan, page 47.

¹⁰⁵ NAO (2023) page 34.

major projects¹⁰⁶. See Table A1 below for a comparison of the roles of IPA, NIC and UKIB (section A.5.3).

Among other functions, the IPA:

- Provides specialist expertise for infrastructure finance where the private sector is the main delivery vehicle and “attracting private finance is fundamental to achieving policy outcomes”¹⁰⁷;
- Provides advice to policymakers on the deliverability implications of emerging policy¹⁰⁸;
- Leads delivery for the Government Major Project Portfolio (GMPP)¹⁰⁹;
- Provides specialist support, tracking and assurance for the GMPP and other projects (see Box 3 below);
- Publishes the National Infrastructure and Construction Pipeline and procurement pipelines;
- Established and managed the UK Guarantee scheme until June 2021¹¹⁰ as well as market engagement, analysis and tendering for e.g. the Charging Infrastructure Investment Fund (CIIF) – both now under the UKIB; and
- Leads external market engagement, providing an interface between public and private sectors on policy¹¹¹.

A.2.1 Government Major Project Portfolio (GMPP)

The projects or programmes on the GMPP are described as ‘*the largest, most innovative and highest risk projects and programmes delivered by government*’¹¹² and elsewhere as the ‘*most complex and strategically significant projects and programmes*’¹¹³.

Government departments must add projects to the GMPP if they fit criteria with agreement of Ministers in Cabinet, HM Treasury and the IPA. Quarterly data reporting on project delivery progress is required¹¹⁴. A red-amber-green (RAG) summary of progress / likelihood of success is given to each listing that in turn can alert Departments to any insights or risks to delivery. Reporting and exemptions to reporting are covered under a written policy on transparency, in line with the Freedom of Information Act¹¹⁵.

¹⁰⁶ Infrastructure and Projects Authority Mandate, January 2021, Ministerial cover introduction. Available from URL: <https://www.gov.uk/government/publications/infrastructure-and-projects-authority-mandate>

¹⁰⁷ IPA, Annual Report on Major Projects, 20 July 2022. Section on Infrastructure Finance, page 38. Available from URL: <https://www.gov.uk/government/publications/infrastructure-and-projects-authority-annual-report-2022>.

¹⁰⁸ IPA ‘About the IPA’, September 2020, page 11.

¹⁰⁹ IPA (2022) Annual Report on Major Projects. Departmental data, published at 31 March 2022, is available from URL: <https://www.gov.uk/government/collections/major-projects-data>

¹¹⁰ UK Guarantee Scheme guarantees the principal and interest payments on infrastructure debt issued by the borrower to banks or investors. IPA Mandate, January 2021, page 5.

¹¹¹ IPA (2020) ‘About the IPA’, page 15.

¹¹² IPA (2022) Annual Report on Major Projects, page 3.

¹¹³ IPA (2022) Annual Report on Major Projects, page 20.

¹¹⁴ IPA (2022) Annual Report on Major Projects, page 3.

¹¹⁵ “Transparency policy on the Government’s Major Projects Portfolio (GMPP) and guidance for departments on exemptions”, last updated 15 July 2021. Available from URL: <https://www.gov.uk/government/publications/major-projects-transparency-policy-and-exemptions-guidance>. The website states this is being updated but there are no links to further documents (at April 2023).

In most cases projects come off the GMPP list when they have progressed through the phases of delivery and no longer need IPA support, although other reasons are also given¹¹⁶.

Observations/Questions

- Is 'real time' investment data (or barriers) tracked for both projects and programmes as part of quarterly data returns to the IPA (the assumption is that this must be the case as part of RAG approach)?
- How do different projects/programmes perform against any original investment assumptions to ensure the metrics or analytics underpinning those assumptions are serving the outcome (and able to be learned from)?
- Transparency: there is an explicit presumption in favour of publication (consistent with the Freedom of Information Act, FOIA). However, how an appeal against an exemption would be adjudicated is not clear (at March 2022 only the Sizewell C nuclear project is exempt from reporting¹¹⁷).

An assurance review process and other steps are triggered if a GMPP project is given a red or double-red assessment¹¹⁸. The IPA states that this means it '*not only informs HMT decision making, but goes through a bespoke, assurance informed, support driven, system approach*'.

Note that following the Risk Potential Assessment of policies or projects (see section A.5.6) the IPA will conduct or guide a review for policies or projects with a high or medium risk assessment.

Observations/Questions

- Are the GMPP tracking processes effective and/or useful for all net zero implementation areas in terms of triggering this detailed support?
- Can this translate down to Local Authority level if local capacity is absent? If so, what entity is best and what services would be most useful?

¹¹⁶ IPA (2022) Annual Report on Major Projects, page 18.

¹¹⁷ This is on grounds of 'commercial interests', under section 43 of Freedom of Information Act.

¹¹⁸ IPA Annual Report on Major Projects 2021-22, page 21.

Box A3. Review of IPA mapping work in 2018¹¹⁹

- The National Infrastructure Delivery Plan (2016-2021), includes public and private projects including electricity generation;
- National Infrastructure & Project Pipeline tracking:
 - Main purpose is transparency
 - Two periods, up to 2021 and a 10 year projection, in the context of fiscal remit on public spending as a percentage of GDP
 - Covers publicly announced projects, above £50m; (can aggregate small data lines to reach threshold if units available on a consistent basis)
 - For 10 year projection: historic data; regression modelling; public & private data; regulatory profile; private sector engagement for view on pipeline.
 - The Delivery Plan is not intended as an investment prospectus.

Updating this short interview-based mapping exercise was the origin of this paper.

Practical steps proposed for to securing implementation and investment:

- Clarify assumptions: investment coming in against policy design
- Test assumptions: investor engagement and analytics/metrics (can finance tools help?)
- Track: risk-based tracking (forward-looking/leading indicators)
- Whole of government approach.

A.2.2 DESNZ projects on the GMPP

Four categories of GMPP project exist; the majority of the DESNZ energy-related projects fit the 'infrastructure and construction' (I&C) category.

In March 2022 a DESNZ spreadsheet summarised the then 23 projects and programmes under the GMPP¹²⁰. This is the latest data spreadsheet available mid-2023 but the IPA reports the number of GMPP projects and programmes is 19, of which 14 are in the I&C category¹²¹.

¹¹⁹ This was an unpublished, bullet summary by the author of the tracking and/or investor engagement functions in the IPA, based on an interview. Other institutions mapped included: the then-BEIS Commercial team; the National Infrastructure Commission; Committee on Climate Change and Transport for London (TfL) as a major city infrastructure institution. This was preparatory mapping ahead of a roundtable hosted by S&P, mid-2018, with financiers and investment practitioners on factors for monitoring investment and whether tools from the finance sector, including the forward-looking credit risk assessment *process*, could help policymakers. The roundtable contributed to a paper 'Investment Confidence for Governments: integrating investment into climate-related policymaking', August 2019.

¹²⁰ BEIS Government Major Projects Portfolio Data March 2022, published July 2022. Note that at June 2023 the only updated information was the 'Accounting Officer Assessments' of each project published by the Office of National Statistics (ONS): <https://www.gov.uk/government/publications/beis-government-major-projects-portfolio-accounting-officer-assessments>. Note that these are not a review of project delivery (RAG rating) but assess against standards for management of public money: regularity, propriety, value for money and feasibility.

¹²¹ The IPA 2022-23 Annual Report. DESNZ also has some projects or programmes under the 'Government transformation and service delivery' category, focused on new technologies that transform the provision of services. These are itemised on the DESNZ GMPP list: 'BEIS Government Major Projects Portfolio Data March 2022, published July 2022 (note this data is still the basis for data in the 2023 Annual Report alongside Delivery Confidence Assessments done by IPA and input from Senior Responsible Officers (SROs). Data publication URL: <https://www.gov.uk/government/publications/beis-government-major-projects-portfolio-data-2022>. This spread-sheet includes status and indicates, where individual projects or programmes are exempt from reporting.

- Funds for outcomes in specific areas, including: R&D grants; the heat network investment project; social housing decarbonisation; funds distributed to Local Authorities to support home improvement and decarbonisation; the net zero hydrogen fund;
- Specific energy projects, including: CCUS clusters; industrial decarbonisation and hydrogen revenue support (in early planning); DESNZ Sizewell C project negotiations team¹²²;
- Several nuclear-related, including: low cost nuclear programme ('Rolls Royce small modular nuclear challenge'); GDF, the geological disposal facility; SIXEP continuity plant and the Replacement Analytical Project for Sellafield.

The DESNZ GMPP spreadsheet is published six months in arrears¹²³. Spreadsheet columns include: the GMPP category; description of project; RAG result; reason for result (project specific areas of challenge / progress against milestones); further IPA support or monitoring for the projects and budget/budget change.

An example for building infrastructure is the Green Homes Grant Local Authority Delivery (LAD) was awarded an Amber Rating at March 2022, the reasons given in the published report were:

'...risks of insufficient staffing, Covid-19 restrictions hindering their delivery, and strained supply chains across materials and installers due to price increases and reductions in supply. Work is ongoing to mitigate these risks through close monitoring of Covid-19 case numbers and by monitoring reports from LAs to assess any impact on installations.'

Observations/Questions

This process has useful features:

- The GMPP spreadsheet is a good starting point on transparency (although finding it is less easy, the spreadsheet is not updated as regularly as suggested, and detailed metrics are not covered in a RAG spreadsheet).
- The DESNZ list includes projects where the outcomes are linked to behaviour or uptake (rather than developers/investors responding to incentives) e.g. domestic building retrofit example above. Are there useful insights where investment or financing issues are linked to demand-side¹²⁴? Noting challenges associated with government funded retrofit support programmes.

¹²² The terms of reference for the Financial Advisory Services contract 31 May 2022 are available from URL: <https://www.find-tender.service.gov.uk/Notice/015208-2022>. The contract was won by Barclays bank and has a total value of £5 million (ex-VAT) to: 'i) assess, input, and challenge the design, management and execution of SZC's capital structure and fundraising process; and ii) provide advice in relation to key judgments and decisions that will be required from HMG in order for it to execute its policy objectives and make sound investment decisions that represent VfM [value for money] for the taxpayer.' Progress under this contract is not reported on, Sizewell C is categorised as exempt from reporting under GMPP due to commercial interests.

¹²³ BEIS Government Major Project Portfolio data, March 2022. Available from <https://www.gov.uk/government/publications/beis-government-major-projects-portfolio-data-2022>

¹²⁴ Other specialist entities do some work on this area, including the Green Finance Institute.

A.2.3 IPA: specialist support to DESNZ infrastructure/GMPP

IPA provides project support to departments including commercial, finance and project delivery expertise, early scrutiny, and challenge, of the assumptions underpinning decision-making; workshop facilitation and conducting assurance reviews¹²⁵.

This policy-facing role includes project finance advice to test and develop proposals that are deliverable by the market¹²⁶.

IPA's infrastructure finance has a particular focus on the energy transition and net zero. As outlined, its specialist support includes¹²⁷:

- Supporting DESNZ on policy formulation such as electricity market reforms, offshore wind transmission development, and proposals for a Future System Operation.
- Supporting HMT and DESNZ on the financial and commercial aspects of business model development for hydrogen;
- A role on the cross-government Project Board of the Heat Networks Investment Programme; supporting the Green Heat Network Fund.
- IPA also worked extensively on specialist funds in the past e.g. the structure, market engagement and establishment (via tendering) of the Charging Infrastructure Investment Fund (CIIF)¹²⁸ and an objective to catalyse the rollout of emerging infrastructure (some functions transferred to the UK Infrastructure Bank).

A.2.4 IPA Infrastructure and Construction Pipeline

As part of its market engagement, the IPA produces a procurement pipeline and the infrastructure and construction pipeline¹²⁹.

The Box below illustrates that energy infrastructure is majority privately funded (the power sector is included in the Energy category) and the report highlights the role of policy tools to 'support' private investment, noting Contracts for Difference (CfDs), the Regulated Asset Base model (RAB) and the UK Guarantees Scheme (UKGS).

¹²⁵ Noted in relation to IPA's role in the development of BEIS CCUS clusters. Annual Report on Major Projects 2022, page 7.

¹²⁶ IPA (2020) 'About the IPA', page 15.

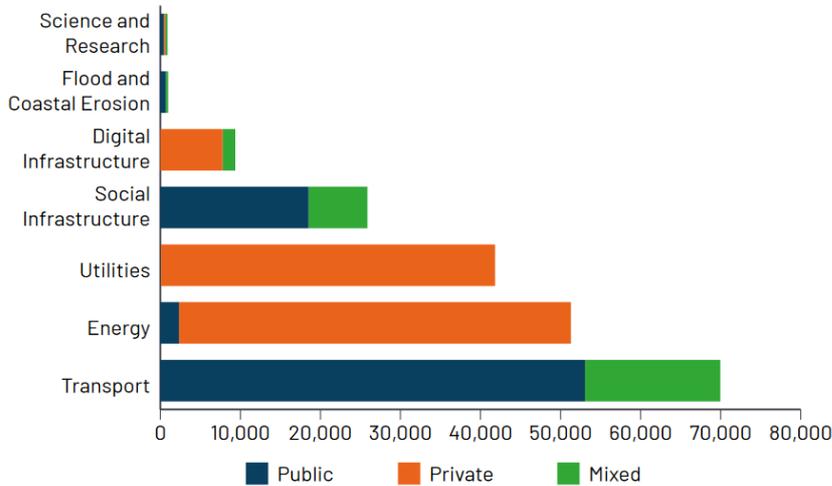
¹²⁷ IPA (2022) 'Annual Report on Major Projects 2021-2022', 'Infrastructure Finance', page 38.

¹²⁸ CIIF had a £200 million cornerstone investment from HM Treasury to be matched with private capital. IPA ran the Request for Proposal process and awarded the fund management role to Zouk Capital. First financial close was reached in September 2019. This fund is now managed by the UK Infrastructure Bank, refer URL: <https://www.ukib.org.uk/ev-infra-focus-charging-future>

¹²⁹ IPA, Analysis of the National Infrastructure and Construction Pipeline 2021, August 2021. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016759/Analysis_of_the_National_Infrastructure_and_Construction_Pipeline_2021.pdf

Box A4. IPA Chart Funding Mix of Planned Investment in the Pipeline from 2021/22 to 2024/5 by Sector (£'m)¹³⁰

Chart 6: Funding Mix of Planned Investment in the Pipeline from 2021/22 to 2024/25 by Sector (£'m)



Energy includes electricity generation and oil and gas.

Utilities includes regulated electricity transmission, gas transmission and smart meters.

UK Guarantee Scheme (UKGS)

Until June 2021 the IPA administered the UKGS which supports private investment in UK infrastructure through the provision up to £40 billion of guarantees and open until at least 2026 to '*nationally significant*' infrastructure projects (economic and social infrastructure)¹³¹.

The UKGS lowers risk by providing guarantees for the principal and interest payments on infrastructure debt issued by the borrower to banks or investors. UKGS is now managed by the UK Investment Bank (UKIB). Application must fit the mandate and principles of UKIB.

Prior to this move four energy related projects had received guarantees: coal to biomass conversion (Drax); Speyside CHP plant; shale gas import and storage facilities (Ineos, Grangemouth) and Sustainable Development Capital Ltd.

A survey of a leading financiers and investors, Q2 2020¹³² included a question on whether respondents had heard of or were using the Guarantee Scheme: while 86% had heard of the scheme only 10% had used it alongside the observation that that it is only for large projects.

¹³⁰ IPA Infrastructure and Construction Pipeline 2021, chart 6 page 16; methodology (as applied to regions) page 29.

¹³¹ The Government website note on shift of UKGS from IPA to UKIB: <https://www.gov.uk/guidance/uk-guarantees-scheme>

¹³² Eversheds Sutherland and UKERC collaboration surveying the impact of Covid-19 on renewables and energy transition (author led for UKERC Energy Investment theme): "Switch on to the new normal, impact of COVID-19 on capital for renewables/clean energy transition", published 7 June 2020.

Observations/Questions

- Is the IPA available to all government departments as an *on-demand* centre of finance and investment expertise and resourced to participate in all policy processes?
- Does IPA co-ordinate a standardised approach to assessing the 'investment quality' of all infrastructure-related policies and plans across government (noting its assurance role¹³³ and its wide remit, see Box A1)?
- What and how is investment data accessed and tracked, beyond GMPP, including against programmes or policy areas and how is this linked with delivery risk?
- How does IPA engage with HMT on its consideration of the finance and investment-related risks (and cost of capital / cost consequences) in departmental approaches? For example, where a long-term, strategy and policies can lower the overall perception of risk and build investor confidence?
- Overlap: does the IPA co-ordinate across HMG investment-focused units or teams e.g. Office of Investment; DBT, teams in DESNZ including mobilising private investment into net zero or green finance; public finance and advisory entities e.g. UKIB, the NIC or the new Net Zero Council? If not, does there need to be one centre of excellence and a common approach?

A.3 Low Carbon Contracts Company

The Low Carbon Contracts Company, LCCC, is a private limited company owned by the Secretary of State for DESNZ. It was established in 2014 to play a key operational role in the delivery of Electricity Market Reform (EMR) process. It executes the contracting and acts as counterparty for the Contract for Difference (CfD) regime as well as managing the Supplier Obligation Levy that funds the payments¹³⁴. It also manages Capacity Market (CM) auctions for its sister organisation, the Electricity Settlement Company, ESC¹³⁵.

CfD monitoring is done against key contract determinants, for example the CfD contains:

- A Milestone Delivery Date: the date against which the developer must go ahead with the project or relinquish the contract;
- The Longstop Date: when the project must be operational and start receiving or making payments under the CfD;

¹³³ Note is made of the Risk Potential Assessment which is linked to IPA executed or guided assurance, however there are multiple factors in this and therefore this question is specific to the investment factor.

¹³⁴ Low Carbon Contracts Company website: <https://www.lowcarboncontracts.uk>. The LCCC together with DESNZ, Ofgem and National Grid ESO also collaborate on a CfD Allocation Round Resource Portal for market and other stakeholders: <https://www.cfdallocationround.uk/>

¹³⁵ LCCC, 'Helping to Accelerate the Delivery of a Net Zero Future', Annual Report and Accounts 2021/2022. Available from: <https://www.lowcarboncontracts.uk/publications/low-carbon-contracts-company-lccc-annual-report-202122>

Investment: the LCCC states that it exists to mobilise private sector investment in secure, low carbon energy. The principles for both organisations include maintaining investor confidence in the regimes they manage. They aim to ‘*shape and implement schemes which enable low-cost investment...*’

The LCCC posts a number of dashboards on its website updated with real-time market information on CfD and CM operations¹³⁶ covering various data and metrics for monitoring and tracking including levies, supplier payments and portfolio generation, as well as historic information and forecasts.

LCCC capacity: visibility on forward market

As the LCCC needs to have in place the capacity to manage and track contracts, it therefore needs a view on the number of contracts likely to be coming forward, not least as the CfD regime evolves and attracts a greater number of smaller-sized deals all needing contracts.

As new support regimes are being developed the LCCC is expanding its role. It is named as the counterparty and settlement agent for two new carbon capture, use and storage (CCUS)-linked regimes, as well as providing expert advisory on regime development, including the Regulated Asset Base, RAB, model for new nuclear¹³⁷.

The Annual Report and Accounts for 2021/22 highlights:

- Approaches to strategic risk assessment
- Open data and ‘*significantly increased*’ transparency around the CfD regime (not least linked to Freedom of Information requests)
- Plans for expanded data publication; actively assesses public benefits against commercial confidentiality¹³⁸.

Observations/Questions

- The public dashboards provide real-time market information with further transparency planned.
- Is there any intersect between information from the dashboards and the DESNZ-commissioned REPD? This is to avoid confusion and to ensure streamlined, usable information for policymakers and other actors.
- To what extent is the LCCC policy role linked to its operational function (i.e. practical input in those areas); how does it intersect with the IPA for example?

¹³⁶ LCCC dashboards at <https://www.lowcarboncontracts.uk/dashboards>

¹³⁷ LCCC, Annual Report 2021/22, sections Implementing New Schemes, page 17.

¹³⁸ LCCC, Annual Report 2021/22; Open Data, page 15.

A.4 Department for Business and Trade (DBT)

In February 2023 the trade department, DIT¹³⁹, was restructured to become the Department for Business and Trade (DBT) to ‘*support growth by backing British businesses at home and abroad, promoting investment and promote free trade*’¹⁴⁰.

At the time of review, DBT’s departmental function was to both support UK exporters and attract international capital for UK investment needs, with a core objective to ‘*Encourage economic growth and a green industrial revolution across all parts of the UK through attracting and retaining inward investment*’¹⁴¹.

DBT works with the **Office for Investment** (OFI) a joint DBT and No.10 unit (see below), to enhance the UK’s investment environment in various ways.

Objectives for DBT’s projects and programmes include¹⁴²:

- Attracting and retaining major investments into critical sectors such as technology, to support government priorities, including clean growth;
- Unblocking barriers to strategically significant investments; working with Office of Investment.

Deliverables include:

- Identification of market barriers and failures affecting investors in the UK;
- Updated services linked to the specific market failures and wider government priorities;
- Monitoring and analytical tools¹⁴³.

Investor engagement is a strong theme: monitoring and assessment techniques include surveys with investors and qualitative interviews with investors as well as monitoring KPIs and econometric analysis. DBT tracks annual foreign direct investment (FDI) to the UK (see 3.4.3 below).

A.4.1 2023 Review of attracting FDI to UK

In March 2023 a review of attracting foreign direct investment to the UK was launched as part of the Powering Up Britain package¹⁴⁴. The six-month review reporting to the

¹³⁹ Department for International Trade (DIT)

¹⁴⁰ Press Release 7 February 2023, <https://www.gov.uk/government/news/making-government-deliver-for-the-british-people>

¹⁴¹ <https://www.gov.uk/government/organisations/department-for-international-trade/about>

¹⁴² DIT Outcome Delivery Plan: 2021-2022, 15 July 2021. Available from URL: <https://www.gov.uk/government/publications/department-for-international-trade-outcome-delivery-plan/dit-outcome-delivery-plan-2021-to-2022>

¹⁴³ DIT, ‘Driving our performance: DIT’s Monitoring and evaluation strategy 2022 to 2025’, 30 June 2022. Available from URL: <https://www.gov.uk/government/publications/dits-monitoring-and-evaluation-strategy/driving-our-performance-dits-monitoring-and-evaluation-strategy-2022-to-2025>

¹⁴⁴ ‘Terms of reference for the review into the government’s approach to attracting foreign direct investment’, 30 March 2023. As stated this will run from April to September 2023. Available from URL:

Chancellor (HMT) and the DBT Secretary of State, will look at how to play to UK strengths in the face of ‘*overseas competition for internationally mobile capital*’, including increasing levels of government subsidy in other jurisdictions, undoubtedly a reference to the US Inflation Reduction Act (IRA) and EU regimes post Russian invasion of Ukraine.

The terms of reference include:

- Reviewing competitor country investment promotion tools and processes;
- DBT and OFI mandates;
- The role of grants (and greater OFI involvement in this area);
- The intersect of local support and national levers;
- The government’s approach to setting and driving investment priorities.

Observations/Questions

- Notwithstanding the apparent emphasis on trade promotion tools, underlying sector policy conditions will have to be in place if the focus is on attracting FDI into power sector and wider net zero implementation (just as the Inflation Reduction Act, IRA, is central to attracting investor interest in the US).
- Is the assumption that effective policies are in place in the UK, and how is DBT engaging on those policy approaches, relative to other entities, at departmental level. Is this through OFI (see below)?

A.4.2 Office for Investment (OFI)

OFI is a joint DBT and No.10 unit launched in November 2020¹⁴⁵. It seeks to create a cross-government ‘*single front door*’ approach to ‘*support the landing of high value investment opportunities into the UK which align with key government priorities, such as reaching net zero, investment in infrastructure and advancing research and development.*’ Staff include experienced individuals from private sector, as well as government, with an intention to resolve barriers to ‘top tier’ investments including regulatory constraints and planning issues.

Observations/Questions

- It is not clear the respective roles of OFI and IPA, for example, in areas like the UK Hydrogen Strategy or other areas of government priority. OFI as co-owned by No.10 suggests a PM level intersect that other areas do not have.
- More detail on the selection process or trigger for becoming ‘high value investment opportunities’ is needed and how this cross-references with GMPP listing. Is this anticipated as **large-scale projects or wide-scale distributed ‘projects’ such as building retrofit or green heat?**
- How is information on barriers shared: e.g. project-related or related to specific policy factors?

<https://www.gov.uk/government/publications/terms-of-reference-for-the-review-of-foreign-direct-investment/terms-of-reference-for-the-review-into-the-governments-approach-to-attracting-foreign-direct-investment>.

¹⁴⁵ Office for Investment launch press release: <https://www.gov.uk/government/news/new-office-for-investment-to-drive-foreign-investment-into-the-uk>

A.4.3 DBT Investment Council

Engagement with financiers and investors is part of a number of areas of DBT's operations – both relating to tracking (see A 4.4 below) and operationally for inward investors.

In addition, in April 2021 DBT established a senior-level Investment Council¹⁴⁶, anticipated to meet twice a year, to provide access to insight for the Government and a platform for *'influential global investors so that they can highlight their perspectives, priorities and concerns relating to UK inward investment'*. Further ad hoc meetings with specific members may occur, as and when pertinent topics and issues arise.

Observations/Questions

- Clarity on how the Investment Council engagement intersects with other senior or priority layers of DBT investor interaction (OFI, IPA etc.) and how granular input gets captured across the layers.
- What is the intersect or overlap with the Net Zero Council (the renamed Net Zero Business and Investor Group established in GFS 2023)? Noting also there is a Scottish Government Net Zero: Investor Panel (with published minutes)¹⁴⁷.
- No minutes for any meetings were found easily either on the UKIC part of gov.uk or via a web search. Publication of the IC discussion, without attribution, would increase transparency and enable additional input or exchange with other Forums.
- Is there an equivalent senior-tier practitioners' forum for insight from smaller implementation-critical entities deploying capital or leading in system 'innovation' areas?

A.4.4 Tracking FDI

The DBT tracks and publishes inward FDI, foreign direct investment to the UK¹⁴⁸. This includes a sector breakdown with renewable energy and 'environment, infrastructure and transportation' categories. It publishes the number of projects and the jobs and also compares DBT numbers with those from the Financial Times and Ernst & Young¹⁴⁹. This includes projects and capital investment values.

The Technical Annex includes FDI definition, sources of FDI (types of financial institution and categories of investors) what is measured, and how data is collected and verified at different stages of involvement and how commercial confidentiality is managed¹⁵⁰.

¹⁴⁶ Outline with full list of members: <https://www.gov.uk/government/groups/uk-investment-council>

¹⁴⁷ <https://www.gov.scot/publications/net-zero-investor-panel-minutes-december-2022/>

¹⁴⁸ DIT Inward Investment Results 2021-2022. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1086643/dit-inward-vestment-results-2021-to-2022.pdf

¹⁴⁹ DIT Official Statistics, Department for International Trade inward investment results technical annex 2021 to 2022, Updated 29 June 2022. Available from URL: <https://www.gov.uk/government/statistics/department-for-international-trade-inward-investment-results-2021-to-2022/department-for-international-trade-inward-investment-results-technical-annex-2021-to-2022#technical-notes-for-publication>

¹⁵⁰ DIT Inward investment results technical annex, June 2022. Section 4.1 'Disclosure and suppression'.

Observations/Questions

- Use-case: how is this information used by DBT and across departments?
- How does it intersect with REPD as relating to renewable energy (or indeed, net zero)?
- How does identification of market barriers, actual FDI and sector breakdowns cross-reference with sector delivery and other departments' policy goals, including net zero?
- Is the DBT approach to commercial confidentiality relevant for other departments seeking real-economy investment information? How 'real time' is the information from the market? [Note that the approach to commercial confidentiality was not reviewed here].

A.4.5 DBT/DESNZ Investment roadmaps

In 2022 the DBT produced 'Investment Roadmaps' for Hydrogen¹⁵¹, CCUS¹⁵² and the Automotive¹⁵³ sectors published by DESNZ and linked to its departmental goals (sectors in the 'ten point plan for a green industrial revolution', 2020¹⁵⁴). An updated and an expanded range of investment roadmaps will be published in 2023, as part of the 2023 Green Finance Strategy.

Importantly, there is, a commitment '*to working with investors to ensure they [the investor roadmaps] contain the information and clarity that will support investment decisions*'¹⁵⁵.

The Roadmaps are being done '*to reflect sectoral investment needs*'¹⁵⁶ and aimed at investors. They provide an overview and timeline of the main policies and objectives, seeking to show government support at well above the canopy level of detail¹⁵⁷.

Observations/Questions

- At what point in the investment decision cycle for investors are these Roadmaps targeted and are they at the right level of detail?
- Are they indeed being used by investors in this way, are they hitting the mark?
- Is there a direct government contact line in place for follow up for investors (the Investment Roadmaps at Q1 2023 did not provide direct contact details on the pdf versions).

DBT also supports UK supply chain development in energy infrastructure, for example offshore wind sector including engagement with market actors and investors to identify

¹⁵¹ Hydrogen Investor Roadmap, Leading the Way to Net Zero, DIT, April 2022. Available from URL:

<https://www.gov.uk/government/publications/hydrogen-investor-roadmap-leading-the-way-to-net-zero>

¹⁵² CCUS Investor Roadmap, Capturing Carbon and a Global Opportunity, DIT, April 2022. Available from URL:

<https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-investor-roadmap>

¹⁵³ Automotive Roadmap, Driving Us All Forward, DIT, March 2022. Available from URL:

<https://www.gov.uk/government/publications/automotive-roadmap-driving-us-all-forward>

¹⁵⁴ BEIS The ten point plan for a green industrial revolution, November 2020. Available from URL:

<https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution>

¹⁵⁵ DESNZ (2023) Green Finance Strategy, page 74, paragraph 15.

¹⁵⁶ As above.

¹⁵⁷ In the context of priorities set out in the ten point plan for a green industrial revolution, 18 November 2020.

Available at URL: <https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution>

barriers and UK strengths in different elements of the supply chain. More detail on this work would be very useful not least the connection between attracting supply chain and market volumes being set through policies (and any other assumptions critical to attracting supply chain development and investment).

It is noted that the UK Hydrogen strategy has a strong focus on ‘business model’ development and the use of public funds to support different parts of the development of the sector at different stages. The IPA, the OFI, an appointed Hydrogen Champion as well as DESNZ investor engagement are all part of the process^{158, 159}.

Observations/Questions

- A desk-based approach does not clarify the feedback loops or relative roles of OFI, IPA and DESNZ or other government departments on specific policy areas, or indeed the exchange of market insight gained between those teams or the transparency around that.
- Use of vocabulary: how does the phrase ‘business model development’ and the nature of the shared process, partnership and roles, differ from ‘policy’ areas e.g. REMA and CfD evolution, or innovation-related public finance?

A.5 HM Treasury

As the UK’s economic and finance ministry, His Majesty’s Treasury (HMT) key functions include controlling public spending, and setting the direction of the UK’s economic policy and growth agenda¹⁶⁰:

Although not involved in direct energy or climate policy design or tracking private investment per se, HMT has a critical role in shaping and ultimately deciding on departmental budgets, as well as economic factors that directly influence investment conditions.

It has lead infrastructure and green finance roles and produces the cross-government rulebooks, notably the ‘Green Book’, governing how policy should be appraised, monitored and evaluated thus central to how decision-making works where the allocation of government budget is required.

A.5.1 The public purse

Through the Spending Review HMT allocates departmental budgets against a proposed outcome delivery plan¹⁶¹. This is a key step in enabling or constraining policy and regulatory approaches. See Box 6 for an example of how approaches to budget

¹⁵⁸ BEIS press release, 20 July 2022. Available from URL: <https://www.gov.uk/government/news/hydrogen-champion-appointed-as-government-accelerates-uk-hydrogen-investment>.

¹⁵⁹ BEIS Hydrogen Strategy Update to Market, December 2022, page 12. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1123751/hydrogen-strategy-update-to-the-market-december-2022.pdf

¹⁶⁰ HM Treasury responsibilities, at December 2022: <https://www.gov.uk/government/organisations/hm-treasury/about>

¹⁶¹ For a more comprehensive outline see: ‘The government’s planning and performance framework’ (Updated 14 June 2021). Available from URL: <https://www.gov.uk/government/publications/planning-and-performance-framework/the-governments-planning-and-performance-framework>

management intersect with investment under the CfD regime (looking back to the 2015-2017 period).

Box A5. HMT budget control frameworks and RE investment –example

In the case of support policies for renewable or low carbon electricity generation, a specific 'Levy Control' framework was introduced in 2011 by HMT and the then Department of Energy and Climate Change (DECC). This set an absolute cap on costs of all low carbon policies funded through levies on electricity with a 20% headroom allowance on spending. The response to an overspend forecast was a series of cuts and changes to support programmes governed by the LCF. The LCF notably covered the Renewables Obligation, RO, Feed-in Tariffs, FITs, and Contracts for Difference, CfDs (the different instruments had different implications for the LCF budget).

This period of cuts had a substantial impact (intended or unintended) on investment confidence and led to a Parliamentary Inquiry on this topic¹⁶².

Four observations from the author on governance and transparency issues at this time¹⁶³:

- The engagement with financiers and investors during the Electricity Market Reform and CfD design process was not matched during the budget cutting phase;
- There was little visibility on when those cuts were occurring or clarity on the specific basis for the cuts which was particularly damaging¹⁶⁴;
- The assumptions underpinning the forecasts were not published at the same time as the cuts, this made it difficult for financiers to anticipate Government actions (or potentially contest the assumptions).
- It wasn't a black box for HMT but it was for those on outside.

Project pipeline and Investment data tracked after the fact showed that UK renewable energy investment halved during the 2015-2017 period and early project development reduced dramatically (see section 2.2. Graphic 1).

The LCF was replaced by the 'Control for Low Carbon Levies'¹⁶⁴ in 2017 following an LCF overspend forecast by the Office of Budget Responsibility (OBR) and a 'Lessons Learned' review published in 2016.¹⁶⁶

¹⁶² House of Commons Energy and Climate Change Committee, 'An Inquiry into 'Investor Confidence in the UK Energy Sector, Third report of session 2015-2016', 3 March 2016. URL: <https://publications.parliament.uk/pa/cm201516/cmselect/cmenergy/542/542.pdf>. The author was a Specialist Advisor to this Inquiry.

¹⁶³ Observations from the author.

¹⁶⁴ The House of Commons Energy & Climate Change Committee report, 'An Inquiry into 'Investor Confidence in the UK Energy Sector', 2016, lists around 10 government announcements ending or changing political or policy support for parts of the renewable energy or wider decarbonisation agenda. See box one: <https://publications.parliament.uk/pa/cm201516/cmselect/cmenergy/542/54204.htm>

Control for Low Carbon levy and HMT analysis

The Control for Low Carbon Levies governs the flows associated with low carbon levies introduced after the CfD framework out to 2025, linking new subsidies with overall cost reductions or, as interpreted, a net reduction impact on bills.

This raised the issue of how HMT assesses risk and the potential for risk reduction to lower overall costs. Political, policy and budget developments resulted in an active debate in the 2018-19 period on options for ‘subsidy-free’ renewables where CfDs could provide a floor price to reduce risk rather than be a paid subsidy¹⁶⁵. Ultimately, this somewhat contorted debate, was about what could be acceptable to HMT in the difficult politics of the time. More recently, UKERC looked at modelling investment cost and risk in the power market¹⁶⁶.

Observations/Questions

- This section is not a review of HMT policy developments to date but reflects the complexity of understanding all of the processes involved in HMT operations and decisions. If the HMT budget allocations do not look stable (including across election cycles) or adequate – this suggests either the policy or the budget will have to change and this can introduce investment risk.
- One observation is that clarifying and de-politicising processes (**‘the black box’** as noted above) will improve investor confidence as this will provide greater visibility on drivers for developments, budgeting and how budget changes take place.
- This should also avoid (or avoid the perception of) inconsistent approaches to expectations of cost reduction or how value for money is assessed etc (e.g. different approaches between renewables and nuclear in the power sector) that add to uncertainty and risk.
- Does Treasury provide guidance on the assessment of risk / cost of capital?

A.5.2 Infrastructure

HMT has an explicit role in infrastructure including facilitating private sector investment into UK infrastructure. With input from its advisory agency, the National Infrastructure Commission (NIC)¹⁶⁷, HMT published a National Infrastructure Strategy in November 2020¹⁶⁸. This noted “About half of all infrastructure spending is private, especially in

¹⁶⁵ For example, Energy Consultancy Cornwall Insight: “The Case for a Floor Price CfD”, 27 June 2018 <https://www.cornwall-insight.com/the-case-for-a-floor-price-cfd/>

¹⁶⁶ UKERC took a modelled approach to risk and investment in “Risk and Investment in Zero-Carbon Electricity Markets”, Blyth, Gross, Nash et al, November 2021. Available from URL: <https://ukerc.ac.uk/publications/zero-carbon-electricity/>. Authors followed up this work in the context of the energy crisis in “Can Renewables and Nuclear help keep prices down next winter, the case for a ‘pot zero’ CfD auction”, Gross, McIver, Blyth, Discussion Paper April 2022. The starting point was reducing risk for investors and stabilising bills for consumers. Available from URL: <https://ukerc.ac.uk/publications/can-renewables-help-keep-bills-down/>

¹⁶⁷ National Infrastructure Commission (NIC) is an Executive Agency of HM Treasury, providing government with “impartial, expert advice on major long term infrastructure challenges”. It covers all economic infrastructure sectors, including energy, transport, water, waste, flood-risk and digital, but not social infrastructure or land-use/agriculture. See <https://nic.org.uk/about/what-we-do/>

¹⁶⁸ HM Treasury, ‘National Infrastructure Strategy, Fairer, Faster, Greener’, November 2020. Available from URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf

energy, water and telecoms.” The IPA’s Infrastructure and Construction Pipeline analysis (see Box A4, above) illustrates that the majority of energy and all of utilities funding is currently private¹⁶⁹.

The HMT Infrastructure Strategy states “*We will reduce policy uncertainty that holds back investment and create a new national infrastructure bank to co-invest with private-sector partners*”¹⁷⁰, alongside noting key sector strategies under development by DESNZ, Ministry of Transport and others.

More effective and streamlined decision-making is also a National Infrastructure Strategy aim including condensing governance to reduce overlaps¹⁷¹ (a key issue arising in this mapping exercise) and involvement of specialists in-house earlier.

Observations/Questions

- Does HMT assess whether specific budget interventions could hold back, or impact, confidence in wider energy transition, net zero-required infrastructure or net zero investment or otherwise increase risk (and cost)?

A.5.3 HMT Infrastructure-related Institutions

Two institutions directly linked to HMT are the UK Infrastructure Bank (UKIB) and the National Infrastructure Commission (NIC), referenced above. Table 2, below, sets out their relative roles, which parts of infrastructure they cover, alongside the IPA.

UK Infrastructure Bank (UKIB)

The UK Infrastructure Bank (UKIB), launched in June 2021, is wholly owned and backed by HMT¹⁷². Describing itself as a ‘*policy bank*’ its aim is to ‘*further the objectives and policy commitments of the UK Government*’ with a funding cap of £22 billion¹⁷³. It is involved in implementation of some existing funds including the Charging Infrastructure Investment Fund (CIIF) and administers the UK Guarantee Scheme, both formerly under the IPA. It is the only national infrastructure-focused public finance entity with an explicit Local Authority mandate.

UK public finance institutions – joint forum

UKIB as well as other public finance institutions – the British Business Bank (BBB), UK Export Finance (UKEF) and UK Research and Innovation (UKRI) - are establishing

¹⁶⁹ IPA (2021) Infrastructure and Construction Pipeline, chart 6 page 16; methodology (as applied to regions) page 29.

¹⁷⁰ HM Treasury (2020), National Infrastructure Strategy, Executive Summary.

¹⁷¹ HM Treasury (2020), National Infrastructure Strategy, Section Five Reforming planning and environmental regulations, page 81.

¹⁷² UK Infrastructure Bank (UKIB) <https://www.ukib.org.uk/about-us>

¹⁷³ Commissioners of HMT and UKIB ‘Keep Well Agreement’ setting up the bank, Slaughter and May. Available from URL:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994136/HMT_UKIB_-_UKIB_Keep_Well_Agreement_Execution_Version_571725453.20__redacted_2.pdf

a joint 'UK Public Financial Institutions Green Finance and Sustainability Forum' to build on experience in mobilising investment across the UK¹⁷⁴.

Observations/Questions

- As a government-backed institution, the UKIB is likely to be one internally-trusted source of investor and market insight, not least from local authority level, like the Green Investment Bank preceding it. Is this occurring and will such market insight be published?
- Will the UK Public Financial Institutions' Forum intersect other forums also engaged on mobilising investment: the Investment Council, Net Zero Council, institutions or forums in devolved administrations e.g. SNIB?
- An outline of the Forum's work will be very useful.

National Infrastructure Commission (NIC)

The NIC is an arm's length Executive Agency of HMT set up in 2015 '*at the heart of UK's infrastructure policy*'¹⁷⁵ to provide expert advice on UK's long-term infrastructure needs, assess challenges, make recommendations and monitor progress. It covers economic infrastructure and its updated 2021 remit includes supporting climate resilience and the transition to net zero as one of four objectives.

As well as contributing to HMT's infrastructure strategy, it conducts an annual progress review¹⁷⁶ and a wider National Infrastructure Assessment every Parliament (five years): the next one is due in autumn 2023. It also seeks to '*understand what factors drive private investment in infrastructure and how the infrastructure industry is evolving*' as part of formulating advice.

The annual Progress Review assesses whether recommendations are on track uses a version of RAG (with data and observations): '*met*', '*partly met*' or '*not met*' against five areas:

- Taking a long-term perspective
- Clear goals and concrete plans to achieve them
- Firm funding commitment
- Genuine commitment to change
- Delivery on the ground

The NIC recommendations, including in its five-yearly assessment, must sit within HMT's limits for gross public investment in economic infrastructure on the fiscal side,

¹⁷⁴ Press statement, 'UKEF and Public Financial Institutions welcome the Government's 2023 Green Finance Strategy', 30 March 2023. Available from URL: <https://www.gov.uk/government/news/ukef-and-public-financial-institutions-welcome-the-governments-2023-green-finance-strategy>

¹⁷⁵ Revised remit letter to NIC Chair Sir John Armitt from then Chancellor Rishi Sunak, 27 October 2021. Available from URK: <https://www.gov.uk/government/publications/remit-letter-to-the-national-infrastructure-commission--2/remit-letter-to-the-national-infrastructure-commission>

¹⁷⁶ NIC, Infrastructure Progress Review 2023, published <https://nic.org.uk/studies-reports/infrastructure-progress-review-2023/>

and on the economic side it must include a transparent assessment of the costs to different end-users, as well as benefits¹⁷⁷.

That said, the NIC 2023 annual Progress Review in energy-related sectors found that while the long-term perspective element of its criteria is in place in place to some degree, implementation across all four other factors critical to implementation are not, including the government's commitment to firm funding.

- Electricity system: four out of five recommendations – **partly met**,
- Energy efficiency and heat: four out of five – **not met**.

Infrastructure and Projects Authority (IPA)

On infrastructure and major projects, part of the IPA's role is to provide bespoke advice to HMT, notably: *'Providing HM Treasury spending teams with expert finance advice to support decision making on policy and on the business cases for specific projects and programmes. Ensuring that advice to Ministers includes appropriate project finance and financial markets considerations.'*¹⁷⁸

Observations/Questions:

- To what extent is the investor engagement and insight from these and other institutions, alongside any assumptions made about consumer/citizen factors, in one place and transparent?
- To what extent can these institutions 'centre of excellence' function extend to practical expertise and support to local authorities on finance and infrastructure where required?

¹⁷⁷ Revised remit letter to NIC Chair Sir John Armitt from then Chancellor Rishi Sunak, 27 October 2021. It states that NIC must demonstrate that its recommendations are affordable and can be accommodated within a 'gross public investment in economic infrastructure of between 1.1% and 1.3% of GDP in each year between 2025 and 2055'.

¹⁷⁸ IPA, 'About the IPA', September 2020, page 15.

Table A1. HMT-related institutions relevant for infrastructure / finance

	IPA Infrastructure and Projects Authority	NIC National Infrastructure Commission	UKIB UK Infrastructure Bank
Role	Reports to Cabinet office and HMT 'Centre of expertise' for infrastructure and major projects - project delivery focus	Executive Agency of HMT Impartial expert advice on major long term infrastructure challenges	'Policy bank' wholly owned and backed by HMT
Scope	IPA - Economic and Social Infrastructure Infrastructure and major projects central to HMG departmental objectives, including <u>Infrastructure, enterprise and growth</u> -Economic: energy, transport, devolved projects -Environment and Defra- linked: food, agriculture, land-use; <u>Public and security</u> -Social: health, social care, education etc. -Defence and crime	NIC - All Economic infrastructure sectors <u>Economic infrastructure:</u> - Energy - Transport - Water - Waste - Flood-risk - Digital <u>Not in scope:</u> - Social infrastructure - Land-use/agriculture	UKIB - Themes: *Infrastructure assets *Networks *New infrastructure technology Range of sectors, priorities: - Clean energy - Transport - Digital - Water - Waste Services: ^ Private sector financing (range of products) ^ Local Authority lending ^ Local Authority advisory ^ Green Heat Network Fund

Observations/Questions

- The CCC has recommended a Minister-led Infrastructure Delivery Group be set up – how will co-ordination work best?

A.5.4 HMT Green Bond Issuance

HMT runs the government's Green Financing Programme: a means to fund selected government projects. It has issued two rounds of sovereign green bonds as well as selling retail green savings bonds, raising £16.4 billion in 2021-2022¹⁷⁹. HMT

¹⁷⁹ HM Treasury and UK Debt Management Office (DMO), 'UK Green Financing Allocation Report', September 2022. The first two rounds of sovereign bond issuance took place in September and October 2021 led by DMO; green savings bonds were sold through National Savings and Investments (NS&I). Two Global Investor Calls (GIC) were undertaken; the Green Gilts Investor Presentation is available from:

determines the allocation of the monies raised to 'eligible green expenditures' with categories mapped against the UK Green Taxonomy and the objectives of the Sustainable Development Goals (SDGs) and ICMA Green Bond Principles¹⁸⁰.

The Chancellor announced plans to include nuclear in the UK green taxonomy, 'subject to consultation'¹⁸¹. As such its non-eligible status for finance through sovereign green bonds could be revised, would this be contestable? In an EU context, the inclusion of nuclear, as well as gas is subject to legal challenge.

There is third party verification of the green credentials. The allocation report itemises how money raised was allocated with case studies on impact.

A.5.5 HMT Net Zero Review and Governance

HMT executed a Net Zero Review (NZR), published in October 2021, into key issues of the transition to a net zero economy, including costs, distribution of costs and trade-offs¹⁸² and on the finance side, the relationship between cost of finance, interest rates and economic growth.

As well as analysing and framing HMT approach to Net Zero, this set out governance recommendations for embedding the review across HMT and government¹⁸³ (unclear current status). These included:

- A new cross-department Climate Board: '*to align work across different functions so that departmental activities are strategically coherent and complementary*';
- A new Climate, Energy and Environment Directorate within HMT – **already established**;
- Building macroeconomic modelling capability, including:
 - demand dynamics and the adjustment to consumption and investment,
 - structural change – detailed sector level representation to capture shifts (responding to carbon price in this case);
- Green Book update on discount rates and carbon values;
- New tools: such as a '*technology framework*' to support decision-making with emerging net zero technologies in an uncertain environment:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033194/Green_Gilt_Investor_Presentation.pdf

¹⁸⁰ HMT and UK Debt Management, 'UK Government Green Financing Framework', June 2021, pages 14-18.

¹⁸¹ The Chancellor's speech to Parliament announcing the budget, 15 March 2023. Available from URL:

<https://www.gov.uk/government/speeches/spring-budget-2023-speech>

¹⁸² HMT 'Net Zero Review Analysis Exploring the Key Issues', published October 2021. The analysis and publication was done prior to the significant power and gas price increases, economy-wide inflation and interest rate increases of 2022. Terms of reference and access to final report available from URL:

<https://www.gov.uk/government/publications/net-zero-review-terms-of-reference>

¹⁸³ HMT Net Zero Review (2021), Annex C Embedding the Review, page 119.

- The NZR uses the Government's Ten Point Plan¹⁸⁴ to graphically illustrate uncertainty level of technologies, government spending and number of technologies at each of four uncertainty levels.
- The rationale for public support: early stage technologies; significant barriers to entry or **uncertainty for investors**; coordination of market actors to leverage capital or lower cost of capital.

A.5.6 Green Book – the essential cross-department rulebook for policy development

HMT produces the cross-government rulebook, the Green Book: this is the core guidance for all departments and institutions for appraising policies, programmes and projects.

As such this document defines the critical process underpinning access to HMT approval and funding on behalf of HMG.

The Green Book also includes the appraisal steps and the design and use of 'monitoring and evaluation before, during and after implementation'¹⁸⁵. There is a separate guidance on evaluation¹⁸⁶.

The Green Book introduction notes there are key specialisms involved in public policy creation and delivery, including commercial strategy, procurement, finance, and implementation and that these must work together from the outset to deliver best public value. Finance and risk appear to refer to the public sector elements.

Appraisal process

The fundamental appraisal process for policy design is based on the following process (Box A6), including deciding on the 'best balance' between factors (bold added):

"Appraisal is the process of assessing the costs, benefits and risks of alternative ways to meet government objectives."

- The rationale for the intervention;
- Producing and assessing a long-list of policy options to produce a '**rational and viable**' **short-list**. The former are developed with results of research, advice of experts, and knowledge of stakeholders (2.3). Expected costs and benefits are estimated, and trade-offs assessed.
- The short-list undergoes a 'five case model' appraisal, including a **risk register**
- Identification of a preferred option based upon **determining the best balance of costs, benefits, risks and unmonetisable factors** thus optimising value for money.

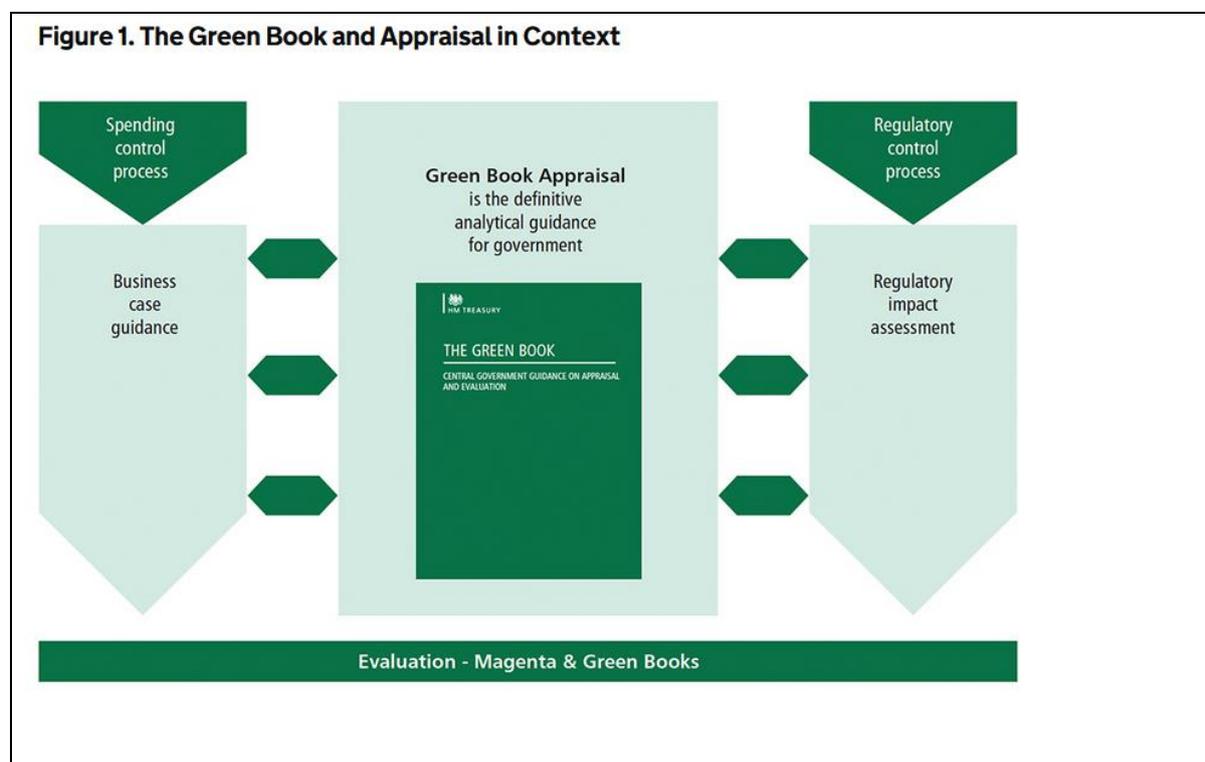
¹⁸⁴ The Ten Point Plan for a Green Industrial Revolution, November 2020. Available from URL: <https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution>

¹⁸⁵ HM Treasury, The Green Book (2022) <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>.

¹⁸⁶ HM Treasury, 'Magenta Book, Central Government Guidance on Evaluation', March 2020. URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879438/HMT_Magenta_Book.pdf

- **Monitoring** is the collection of data, during and after implementation to improve current and future decision making.
- **Evaluation** is the systematic assessment of an intervention's design, implementation and outcomes.

Box A6. Green Book appraisal process



Policy appraisal and investment due diligence – do they line up?

To align policy and investment effectively, one question is how policy appraisal and investor due diligence processes line up and how divergence would be identified and navigated?

As in the box above, Green Book process involves assessing five factors: strategic; economic; commercial; financial; management; procurement¹⁸⁷.

The management element, covering '*practical arrangements for implementation*' includes:

- A risk register and plans for risk management
- Arrangements for monitoring and evaluation during and after implementation

¹⁸⁷ A useful summary is the 'Checklist for Assessment of Project and Programme Business Cases', Templates and support material for the Green Book, URL https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1072128/Business_Case_Reviewers_Checklist.pdf

Risk is largely referring to the **public sector's** risk exposure as a consequence of public policy decisions¹⁸⁸.

Risk Potential Assessment

More practically, for a project or programme the assurance process involves completing a Risk Potential Assessment (RPA) template¹⁸⁹. This sets out grids for two types of assessment:

- A Consequential Impact Assessment: covers consequences 'if the initiative fails to deliver its objectives to time, cost or quality';
- Complexity Assessment: covers the factors that may affect the achievement of the objectives.

Five tiers of risk are used to present the 'holistic' view at each element: very low > low > medium > high > very high. The two Assessments are cross-referenced to give an overall result, which in turn determines the type of review process. Generally, the **IPA** then directly or indirectly leads in assurance reviews for high or medium risk cases respectively.

It is beyond the scope of this work to delve deeper. However, the NAO's Guide to Corporate Finance in the Public Sector¹⁹⁰ provides a view on commercial finance considerations including the organisations and functions across government. There are other entities that conduct detailed assessments of investment and returns, including regulator Ofgem, and public finance institutions.

Observations/Questions:

- It is still not clear if there is an ex-ante Investment Assessment – standardised, investor-relevant due diligence on the policy process. Investment risk elements in policy packages help unpick cost implications (and impact on cost of capital). The IPA or OFI may perform this role in policy processes but is this standard or only in priority areas?
- Transparency: there is a need to increase transparency in this area, including on relevant modelling assumptions and indeed the overall HMT 'blackbox', as described.

Green Book changes: the Chief Economist Appraisal Group (CEAG)

Developments of the Green Book and supplemental guidance involve the cross-government Chief Economist Appraisal Group (CEAG).

HMT and CEAG are critical to any developments: "Where departmental guidance affects other government departments, or contains significant developments in

¹⁸⁸ HMT (2022) The Green Book, Section 5.6 Uncertainty, risk, optimism bias, sub-heading 'Risk'. (viewed online, no page number)

¹⁸⁹ Treasury Approvals Process, related content: 'Risk Potential Assessment template' available from <https://www.gov.uk/government/publications/risk-potential-assessment-form>

¹⁹⁰ NAO, 'Guide to Corporate Finance in the Public Sector', September 2022. Available from URL: <https://www.nao.org.uk/insights/guide-to-corporate-finance-in-the-public-sector/>

methods and approach, it should be agreed with HM Treasury and its content subjected to peer-review by the Government Chief Economist Appraisal Group.”¹⁹¹

Observations/Questions:

- Given the notable gaps in delivery, is a Net Zero **Senior [Green] Investment Appraisal Group** (SIAG) needed for HMT and/or cross-Whitehall contributing the right analytic base for delivery-risk (alongside economic analysis)? Or is this a function intended for the Investment and Net Zero Councils?
- Are there other constituencies or experts that can join the Chief Economists, whether on Green Book or other, to ensure that the limitations of economic analysis are balanced with other economy, sustainability and society-relevant factors (a wider Climate or NZ Delivery Group)?

A.5.7 Gaps: dependencies / System-level and Grid

There are clearly gaps in assessment. The Green Book, and the Risk Potential Assessment process, explicitly require review of dependencies¹⁹². The Green Book definition even uses the example of a policy that is reliant on particular infrastructure to be successful.

With all this in place, how did failure on grid infrastructure and access to network connections reach such a substantial scale¹⁹³ with now pressing concern about impacts on renewable energy growth and energy storage investment¹⁹⁴? Notwithstanding the central role of Ofgem in infrastructure regulation and investment, this issue is not new for government¹⁹⁵ as the appointment of the Electricity Networks Commissioner attests.

On the face of it, approaches in newer policy areas such as hydrogen policy and REMA suggest that system-level interdependent factors are more clearly in focus¹⁹⁶.

However, for policy processes perhaps completed (or dropped) or introduced at an early stage of the electricity sector transition (and intersecting areas) what systems

¹⁹¹ HM Treasury, The Green Book, 2022, Section 1.1. Available from URL:

<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>.

¹⁹² The Green Book stipulates that policymakers should determine benefits, risks, constraints and dependencies – the latter described as ‘external factors such as infrastructure that an option is reliant upon to be successful, but which are beyond its direct control.’ paragraph 4.13, page 26.

¹⁹³ The Energy Security Plan notes over 250GW of generation awaiting connection (compared to around 80GW connected in the UK at Q1 2023). The Offshore Wind Champion’s March 2023 report, set this at over 140 renewables projects representing at 300GW of RE capacity.

¹⁹⁴ ‘Letter on behalf of six storage and renewables trade bodies on the need for urgent action to address network constraints’, Press Release 13 December 2022. Available from URL: <https://www.regen.co.uk/regen-calls-for-urgent-action-to-address-electricity-network-constraints/>; reported in 2022 by the Financial Times ‘Renewables projects face 10 year wait to connect to electricity grid’, 8 May 2022 and 6 February 2023 ‘Renewable groups attack grid connection delays’

¹⁹⁵ For example, this issue was flagged in the 2009 report by the author, ‘Unlocking Finance for Clean Energy: the Need for ‘Investment Grade’ Policy’, Chatham House Programme Paper The importance of access to grid had been flagged in workshops from 2004-2008 leading up to this synthesis report.. Available from URL: https://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/1209pp_hamilton.pdf

¹⁹⁶ As an example, BEIS (2022) REMA consultation, July 2022, page 61, states that the scope of REMA does **not** include design of energy efficiency and low carbon heating schemes and regulations, however it will ‘*consider whether and how electricity market design should further incentivise electricity demand reduction*’ and provides initial proposals.

are in place to monitor and pick up implementation-related ‘dependency’ concerns early, not least where long lead-time infrastructure or overall system integration is involved. Issues such as resilience and adaptation, circular economy pressures, inter-sectoral factors are emerging, may not have political currency yet, but which are likely to come to bear in an infrastructure-relevant timeframe? This is also key to retain the ability to strengthen and accelerate goals in the future.

Observations/Questions

- What are the relevant intersects between a risk assessment during policy appraisal or risk assessment and investor due diligence-level assessment of risks?
- The ecosystem of financiers and investors doing due diligence (DD) exercises are one source of information on **where system constraints are arising or anticipated that impact investment decisions**. This is particularly the case for longer-term factors such as grid and distribution infrastructure or factors that impact access or cost of access to networks for both generation and storage.
- Is building energy efficiency (and retrofit) seen as a ‘dependency’ or system issue or indeed other demand-side/electricity system flexibility technologies or interventions?

A.6 Other institutional work

A.6.1. The Committee on Climate Change

The CCC is an independent, statutory body with a remit that includes an annual report to Parliament on progress to implementing legally binding carbon budgets as such monitoring that progress and risk to delivery is a core function. It also advises the UK and devolved governments on emissions targets and adaptation. It is included here due to the detailed work on a monitoring framework.

The 2023 Progress Report to parliament had been launched at the point of publication of this discussion document.

CCC Monitoring Framework

In 2022 the CCC produced a revised, comprehensive **monitoring framework** covering sectors and role of individual government departments.

The CCC’s work seeking greater co-ordination, transparency and public reporting on net zero is referenced in the 2023 Net Zero Growth Plan¹⁹⁷. The government said it would ‘directly address’ these themes by further strengthening governance. This

¹⁹⁷ DESNZ (2023) Net Zero Growth Plan, the section on ‘Embedding’ refers to both the CCC and the Independent Net Zero Review by Rt Hon Chris Skidmore -enhancing coordination and transparency, p104 -105.

included sharing further detail on the tools and processes to inform decisions and policy-making, not least ‘a map of the governance landscape’¹⁹⁸ (see A.1.6 above).

By the 2023 Progress Report, the CCC’s headline was ‘**Transparency is no substitute for real delivery**’¹⁹⁹ and it set out department by department, and cross-cutting steps to remediate plans, or lack thereof, that put meeting carbon budgets at risk.

2022 Monitoring Report: the Electricity Sector

The CCC’s 2022 Monitoring Report, provides a list of indicators and sources as well as gaps for the electricity sector²⁰⁰. For the energy sector this includes:

- The Renewable Energy Planning Database (REPD)
- Offshore wind leasing rounds executed by The Crown Estate,
- National Planning Inspectorate list of infrastructure projects entering planning.

Key data gaps identified (2022):

- Offshore wind: distinguishing between fixed and floating turbines
- Small scale solar: REPD monitors >150kW, a third of generation is sub-50kW
- Demand flexibility: new metrics needed, limited data from demand measures in ancillary services market
- Networks: aspects of transmission and distribution capacity; on the latter, the link with Ofgem’s pricing review is noted.

Beyond data gaps: 2023 Electricity decarbonisation and Progress Report

The CCC’s report on delivering a decarbonised power system²⁰¹ and its mid-2023 Progress Report to Parliament²⁰², goes much further than data gaps, saying that a credible strategy for the power sector is ‘overdue’, this lack making it difficult to assess the credibility of individual policies.

Priority recommendations include:

- It sets out what key elements of a **standalone overarching power sector decarbonisation plan** should, including how policies and levers will interact; assessment of key delivery risks; clarity on governance arrangements, roles of different parties, monitoring and evaluation.

¹⁹⁸ DESNZ (2023) Net Zero Growth Plan, page 105.

¹⁹⁹ CCC website: <https://www.theccc.org.uk/2023/06/28/better-transparency-is-no-substitute-for-real-delivery/>

²⁰⁰ The CCC, Monitoring Framework, available at: <https://www.theccc.org.uk/publication/ccc-monitoring-framework/?chapter=5-electricity-supply#future-improvements>

²⁰¹ ‘Delivering a reliable decarbonised power system’, 9 March 2023,

<https://www.theccc.org.uk/publication/delivering-a-reliable-decarbonised-power-system/>

²⁰² This was just published at time of finalising this paper and not analysed in detail.

- A **Minister-led Infrastructure Delivery Group** to expedite the removal of barriers to implementation. Challenges include need for a forward-looking auction schedule, project planning and consenting, and network connections.

Observations/Questions:

- The key planks of the proposed power sector decarbonisation plan are exactly the kind of issues that investors are looking for visibility on.
- Is there an opportunity to sharpen the link between delivery risk and tracking investment? Getting a further layer of risk-based detail of whether sector policies on track to deliver. This needs to be dynamic and connected to remedial action.
 - REPD monitors projects at different stages but does it address detail of why projects are stalling?
- Cost: risks in policy design (or appearing during implementation) can contribute to higher cost of capital and therefore overall costs.
- While the CCC emphasises in 2023 that ‘transparency is not a substitute for delivery’, in this working paper transparency and tracking are seen as a critical **dynamic process** for securing delivery (an early warning feedback loop) rather than as a technical reporting exercise.

ANNEX 2. Checklist – issues arising

Issues for further assessment arising in this review.

Due to the desk-based nature of the review, some of these issues may be ‘in hand’ or additional context missing.

Coordination

- Which entity is in the lead across in-house expertise in different locations across government?
- Capacity: is in-house financial expertise available on-demand across government (in-house ‘centre of excellence’ or arm’s length), if not already?
- Has the capacity and support needs of sub-national government or other localised constituencies been assessed? Is this available on-demand?
- Is transparency and contestability reinforced by processes across data, analysis and engagement?

Investment confidence: policy design & implementation

- Process: is there a systematic or standardised ‘Investment Assessment’ process used during policy design that clarifies investment-related assumptions and tests those with investors? This is implied in Green Book appraisal but does not appear to be clear in practice other than some larger-scale priority areas.
- Engagement: there appears to be multiple forums for engagement - is there a consistent, structured basis for this and best-practice on transparency?

Delivery risk: what is being tracked?

- Data and analytics: what investment-related data and market insight is being accessed and tracked on a systematic basis?
- Is this risk-based and on sufficiently forward-looking analytic basis to determine if policies are ‘on track’ to deliver goals and at **the** tier of detail to identify specific risks or barriers to investment (rather than volume of capital)?
- If not is this a data issue, a process issue or both?
- Are HMG departmental and institutional approaches in this area coordinated or overlapping?
- Is there a ‘live’ dashboard or structured approach to ensure insight gained from investor engagement or analysis is available across institutions, devolved administrations, local government. Is this accessible and contestable to a wider group of potential investors and stakeholders?
- How are wider trends in the financial sector being tracked (headwinds and tailwinds impacting investor appetite (from macro-conditions to new analytic approaches that influence allocation of capital or products or indeed impacting the project pipeline)?

- How do investment expectations or investment-related barriers in areas like 'innovation' fit into the wider climate plan. How are smaller-scale / highly distributed investments or barriers (such as energy efficiency, rooftop solar, community ownership, heat or retrofit) being captured?

Course correction: tracking and policy review

- Is there a clear feedback loop between a tracking dashboard and review/revision of the policy or budget if assumptions are not being met?

System barriers:

- Early warning on risks: are risks identified by investors during policy development processes transferred to a dashboard to track. How can relevant real-time data be accessed: can finance tools or processes help²⁰³?
- Early warning on longer-term system/infrastructure factors:
 - If not in place, can a standing review (annual or twice-yearly?) due diligence (DD)-tier investor engagement provide insight on emerging system or policy interdependencies? For example, in newer areas such as green heat, EV infrastructure (and V2G) and distributed storage/generation.
 - Can this forum also pick up wider project or sector DD assumptions or observations on climate resilience and adaptation, or skills/jobs barriers or other emerging issues such as biodiversity?

Analytics and metrics

- Does current analysis or appraisal (HMT/Green Book) align with investor due diligence, risk and value, especially as risks are likely to translate into higher cost of capital (and some risks may be a barrier)?
- Do we need a SIAG – Senior (Green) Investment Appraisal Group - or wider Climate/Net Zero Delivery Group – alongside CEAG? This arises from the question: are there other experts or other constituencies that can join the Chief Economists to ensure that the limitations of economic analysis are balanced with other economy and society-relevant factors?
- Is the basis for making trade-offs clear - as part of helping investors and other stakeholders understand and contribute to the values and drivers underpinning government decisions²⁰⁴?
- Does this dock-in to value in areas like social acceptance, trust and community engagement.

²⁰³ Hamilton (2019) proposed looking at Credit Risk assessment as a forward-looking, structured method of tracking risks, not in terms of arriving at a credit rating but examining the relevance of the process and method for policymakers. Preceding work by the author looked at a structured process for Investment Assessment and a broader governance framework, building on tools or processes used by investors. The relevance of the TCFD regime's 4-part framework (governance, strategy, risk management, monitoring/tracking) was also seen as a 'TCFG' framework – structuring an approach to climate-related finance for Government.

²⁰⁴ The Linear Infrastructure Planning Panel have covered some of the practical factors for discussing trade-off areas with local communities. Other frameworks such as participatory decision-making, highlighted by the CCC, will be a source of information not investigated further for this paper.