‘INVESTMENT CONFIDENCE’ FOR GOVERNMENTS:

ensuring climate policy attracts capital

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Summary Points

- To deliver climate actions that are consistent with Paris and the IPCC 1.5C report, it will be essential that governments set policy conditions that secure the investment required.

- “Investment confidence” for governments (as well as investors) –means wiring investment considerations into policy more systematically across the economy.

- Embedding investment directly into policy design and monitoring can help avoid ‘delivery risk’ – and provide an early warning if barriers remain.

- The world of finance itself can help: the TCFD offers an effective structure for doing this across the system of decision-making (national or local). Risk assessment tools and green evaluation also have significant potential alongside structured engagement with financiers.

- Rapid technological innovation and sectoral change is creating both complexity and significant opportunity; this is positively reinforced by ramping up of attention on ‘ESG’ and momentum to align finance with climate and sustainable outcomes.

- With a substantial investor appetite for sustainable ‘green’ infrastructure, the big opportunity is to accelerate the development of local conditions at the right level of detail (policy, regulation, public finance) to accelerate market activity and the investment pipeline.

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THANKS and ACKNOWLEDGEMENT

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1. Overview

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Securing investment for near-term climate policies

To achieve a just transition to a climate-compatible future, trillions of dollars need to be invested across all sectors of the economy. Policymakers are designing new interventions to accelerate the pace of investment. How will we know if these policies are working? How we identify when we are off track and make course corrections?

An economy-wide transition of the scale required to address climate change has never been done before and we need new tools, frameworks and data to help us chart the course to achieve this. This report explores delivery risk, the gap between the stated goal of climate policies in investment terms, and the real-world financial flows that underpin economy activity around the world.

The Paris Agreement and the IPCC's report on 1.5C have underlined the need to accelerate the pace and scale of investment into climate solutions: to achieve the 1.5C[1] objective requires significant emissions reductions from *"rapid and far-reaching transitions in energy, land, urban and infrastructure … and industrial systems"*[2]. It is difficult to overstate the unprecedented scale of the challenge, or the consequences of failing to deliver a just transition.

The multi-trillion dollar volume of overall investment required is the focus of multiple scenarios[3]. However, near-term policymakers need to ensure policies are attracting the requisite investment or, if this is not occurring as anticipated, identify gaps and step in.

This is the practical end of accelerating the build-out of projects and businesses at the helm of decarbonisation. It incorporates everything from electric vehicles and renewables to the broader shift to new systems that deliver a fair, zero-emissions economy for all.

Tackling 'delivery risk': closing the finance-policy gap

This work started by asking whether analytics approaches or metrics from the finance sector could be adopted by government (national or sub-national) to help design and monitor policy more effectively. Doing so could create an agile and systematic 'early warning' if there are risks that private sector investment is not coming to bear as anticipated.

'Delivery risk' is a useful way to think about this: the UK's Committee on Climate Change assesses the risk of not achieving climate implementation policies against specific criteria, assigning an overall risk weighting score. Tracking delivery risk allows policymakers to assess progress and make course corrections.

Looking ahead: managing the risk that policy conditions will not attract investment

Monitoring delivery risk is a forward-looking exercise to avoid the gap that can occur between policy decision-making and the resultant impact on private investment decisions. The measurement of financial flows per se, in contrast, is largely a backward looking exercise that tracks capital that has been committed, post financial-close.

This is inherently linked to the policy design stage and testing investment assumptions during that process. Indeed, experience leading engagement between finance practitioners and policy counterparts during policy design highlights the importance of having processes in place to bridge between the two worlds.

Within the financial sector there is growing interest in products and tools that the supply of capital towards 'green' and sustainable outcomes Accelerating the convergence between these 'top down' developments and the need to deliver near-term emissions reductions on the ground is not only essential but presents a significant opportunity given the strong appetite for investing in infrastructure assets, including renewable energy and low-carbon options under the right conditions.

Re-wiring finance and government?

Taking a step back: the detailed question of how to best monitor delivery risk raises the more fundamental issue of whether governments also need a 'system change' to integrate investment into their decision-making more comprehensively. This means institutional arrangements, processes and analytic tools to expedite more effective decisions, faster, at the right granularity of detail to mobilise capital.

Governments need to be confident that their policy regimes will attract the investment assumed, just as investors need confidence in the drivers, design (and, if relevant, the compliance regime) underpinning government objectives. This is about building 'two-way' investment confidence.

The world of investment again provides a potential transferrable approach, namely the leadership work of the Taskforce on Climate-related Financial Disclosure (TCFD)[4]. The TCFD has developed a framework for mainstreaming climate change (risk and value) into financial institutions. In a mirror way, the four-part framework is directly relevant to help institutionalise 'climate-related finance' into the architecture of government: governance, strategy, risk management, metrics and targets.

Finance-Policy Exchange

S&P Global Ratings kindly hosted a roundtable[5] for leading finance practitioners and experts together with senior officials in government and official bodies. This set out to explore the potential metrics for investment, risk assessment and project tracking that could form part of an overall approach to better managing delivery risk in climate policy.

Discussion ranged across areas that often exist in separate silos: investment in new technologies and infrastructure as sectors decarbonise; green finance and evaluation tools and climate resilience and adaptation analytics. Detailed work and developments at intersections between these parts of the landscape emerged as an important theme.

[1] Intergovernmental Panel on Climate Change (IPCC), 'Special Report Global Warming of 1.5°C', 8 October 2018. Available from URL: http://ipcc.ch/report/sr15/.

[2] This is from the Summary for Policymakers, paragraph C2, page 21. In full:
"C2. Pathways limiting global warming to 1.5C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings) and industrial systems (high confidence). These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options (medium confidence)."

[3] The IPCC 1.5°C Report outlines investment-linked scenarios in its Chapter 4. Other notable scenarios include the New Climate Economy Report 2018: "We expect to invest about US$90 trillion in infrastructure to 2030, more than the total current stock. Ensuring that this infrastructure is sustainable will be a critical determinant of future growth and prosperity. The next 10-15 years are also essential in terms of climate…"

[4] This was launched in Paris, COP21, by Michael Bloomberg, former New York Mayor and businessman and Mark Carney, Chair of the Financial Stability Board (FSB) and Governor of the Bank of England. URL: URL: https://www.fsb-tcfd.org

[5] The Roundtable took place under the Chatham House Rule: quotes in this briefing are not attributed for this reason.

State of the Market: investor perspectives

Energy transition/timeframe: investment will find a way in, but will it do so fast enough?

"We're 20 years in to a 50-year transition and the last 20 years were the easy bit."

As well as scaling mainstream investment in mature renewable energy projects, there is now considerable investor attention on the newer technologies underpinning the energy and transport sector transitions.

"It is messy out there, but investment is finding a way in".

Notwithstanding this activity, there are not yet benchmarks to determine whether the 'trickling in' of investment is fast enough.

The role of policymakers in accelerating this 'new wave' of sector (and inter-sectoral) technologies remains important, although this has evolved from the targets and subsidies of the first phase of support that enabled renewables to move to maturity. This phase of sector transition and innovation can be as much about removing obstacles – including where regulatory 'undergrowth' from the 'old' energy system is creating barriers – as it is about understanding and monitoring gaps in newer and harder to reach sectors and will be strongly dependent on the national or local context.

The number of moving parts across the system means this is not straightforward and highlights the importance of agile processes to reach decisions and monitor results.

Monitoring actual investment is difficult

This was a surprising factor: both national government and green finance participants noted the difficulty of monitoring investment in absolute numbers. The data and tracking, beyond traditional larger infrastructure projects, is not straightforward.

In addition, on the input end, detailed assumptions about how investors will respond to policies (sector-level, non-regulated assets) may not have been made, or tested, and that adds to the complexity of monitoring policy against delivery.

Credit Risk Assessment and Green Evaluation – can this translate to a policy context?

Green evaluation tools are already being developed and used to enable investors to identify the contribution of individual investments to environmental goals and to translate this in a standard way for the market. This can include measure of environmental and social impact. This is an indicator of where relative green value lies and is a reflection of rising investor attention to 'ESG' (environment, social, governance) factors and broader sustainability performance.

One avenue to examine further is whether this approach can be applied to a policy context itself to provide an indicator for investors of the 'green value' of investments under that specific regime (against the relevant national or local baseline). The interesting prospect being flagged is that this could increase investor appetite / liquidity for harder-to-reach sectors, as it simplifies understanding for investors of this added line of value.

Although there are some promising avenues for adopting private sector risk assessment practices in policy making, we did not reach a single answer on the original question of how metrics used by the financial sector can help policymakers assess policy frameworks. However, simply incorporating structured processes of risk assessment appears to be highly relevant to policy makers.

Expertise Pooling

One clear opportunity and need is expertise pooling to bring currently separate elements of this landscape together to accelerate an integrated approach to longer-term climate and climate-aligned goals. New data sets, scenarios and forms of evaluation/analytics relevant to this more complex, new territory are starting to be developed and are an important part of re-wiring the system.

The question raised in this paper – on the practical integration of finance and policy - sits in this context.

Taking this forward

Further work is recommended in three areas.

1. For policy-makers: investment-relevant risk assessment of policy

Further examine the processes and metrics used for risk assessment and stress testing to develop a framework (or dashboard) for incorporating an assessment of investment assumptions within the policy framework itself ('delivery risk') and whether these are being met. This is applicable for both policy design stage and for monitoring implementation. More specifically:

- Test options against real world examples, including situations that can shed light on two questions:
  ~ Does this work for newer technologies/businesses, including sectors under transition?
  ~ Can this be made practical and straightforward for low-resource situations (e.g. cities or under-resourced governments)?

2. For investors:

Examine whether a green impact evaluation of the policies themselves (with a local baseline) could be done, with a view to simplifying this for investors interested in adding a green impact factor to investments under that policy regime.

- Can this help increase liquidity, attracting a wider pool of investors, especially in harder to reach sectors?

3. For Governments: TCFG "Climate-related Finance for Governments"?

Test further the practicality of TCFD as a useful 'whole of system' framework for Governments to integrate low carbon investment into decision-making. While many governments will be using elements of this, albeit in a fragmented fashion, the proposition is that a considerably more systematic approach will set the conditions for rapid scale-up of investment.

Annex 1 illustrates how governments can use the TCFD's template.

2. Introduction

2. Introduction

To examine the premise that analytic tools or metrics from the world of finance can help the assessment of whether policy is attracting capital, S&P Global kindly hosted a roundtable with senior finance practitioners and public and private sector experts, held under the Chatham House rule (quotes are not attributed for this reason).

Participants reflected:

- Considerable track-record across key low-carbon sectors, including renewables, energy efficiency and battery storage;
- Extensive experience in debt, equity, specialist advisory and infrastructure ratings assessment;
- Leadership in emerging fields of green evaluation and climate resilience analytics;
- Senior public sector leads with economics, infrastructure, regulatory and investment roles and experience.

S&P GLOBAL RATINGS

ROUNDTABLE: SECURING INVESTMENT FOR CLIMATE POLICIES - ASSESSING WHETHER THE MONEY WILL FLOW? 27 July 2018
S&P Global – London – Boardroom

The roundtable discussion, alongside further insight from interviews and feedback, provided an important opportunity to unpick a complex but apparently 'missing piece' in the policy debate (policy covering the range of tools at the disposal of governments).

This working paper starts at the more detailed end: outlining the risk focus and reflecting 'state of the market' perspectives on financing sector-level transition, then moves out to the overarching tools for greening the financial sector as well as cross-cutting climate resilience analytics. This broader landscape forms the base for the observations and recommendations in the concluding section.

The fact that there is no straightforward answer for 'forward metrics' to monitor investment against delivery is interesting in itself – it takes time for a tour-de-table of people that are doing detailed work in intersecting, but different areas. Much of the detail being grappled with is about bringing elements of the landscape together from detailed separate areas in a new, operationally relevant way. This has been described as 'gearbox' work: working out which of the separate cogs need to intersect and how to do this to propel and accelerate implementation. This is, to some extent, new territory.

Another starting observation is the complexity of talking about an area which does not yet have pre-set or commonly used 'shorthand'. This is particularly so when words are being used in plain language way by one party but which have a precise and detailed meaning at practitioner level for another. These translational mismatches reinforced the importance of expertise pooling to enable better exchange across sectors.

Background scene-setting

Short public and private sector scene-setters were given on the UK situation to anchor the focus in a real setting (not summarised further in this paper*):

- The independent Committee on Climate Change's definition and criteria for assessing 'delivery risks' to sector-level policies (see Graphic 1, below);
- The approach to infrastructure project pipeline tracking by the Infrastructure and Projects Authority (both regulated and market-driven infrastructure, above £50 million);
- Investor engagement linked to energy and industrial policy ('Commercial Team') and the objectives of the new cross-government approach to promote 'green finance' (Department of Business Energy and Industrial Strategy);
- Private sector perspectives on:

Infrastructure ratings assessment in a policy context (offshore wind example), S&P Global;

Green evaluation, S&P Global;

Energy sector transition and implications for energy finance, Baringa;

Local government transport investment, Transport for London (London's largest energy user, with a resource base, and data, across land and various energy assets).

* This background is available from the author.

Engagement, economics and finance

Underpinning this is a broader body of experience in active and structured engagement between senior finance practitioners and leading policymakers on 'investment grade' policy. This includes on both renewable energy policy and complex energy market reform issues. There are a set of transferrable, highly practical lessons arising.

An additional important factor is the boundary between the economic analysis of policies and how that can differ from the more risk-based analysis that financiers use in making investment decisions. Bridging between financiers and policymakers in a systematic way is therefore an important step in securing outcomes.

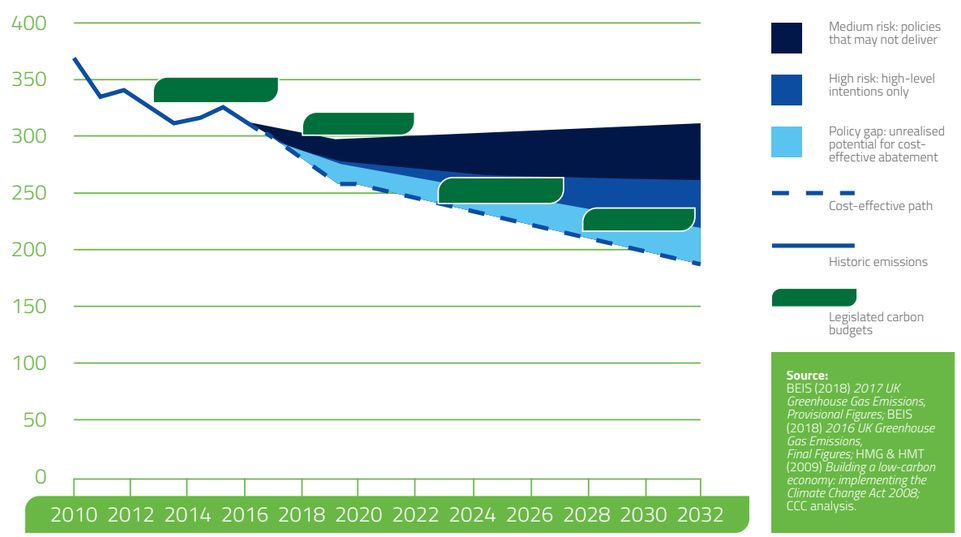
Graph1. Reference: Delivery Risk – the Committee on Climate Change

The UK Committee on Climate Change (the CCC) assigns a risk-weighting to delivering specific policy-related emission reductions at sub-sector / technology level.

The delivery risk weighting (low, medium, high) and a 'policy gaps' category - signalling potential for further cost-effective emissions reductions - is applied against a forward 'cost effective abatement' trajectory in line with 2050 goals

Three main criteria are used in the assessment of delivery risk - whether the policy or measure:
i) Tackles the right barriers
ii) Creates the right incentives
iii) has necessary public funding

Figure 3. Risks remain around delivery of policies to meet the fourth and fifth carbon budgets



Source:
BEIS (2018) *2017 UK Greenhouse Gas Emissions, Provisional Figures;* BEIS (2018) *2016 UK Greenhouse Gas Emissions, Final Figures;* HMG & HMT (2009) *Building a low-carbon economy: implementing the Climate Change Act 2008;* CCC analysis.

'Reducing UK Emissions, 2018 Progress Report to Parliament', The Committee on Climate Change, June 2018[6].

[6]Available from: URL: https://www.theccc.org.uk/publication/reducing-uk-emissions-2018-progress-report-to-parliament/

3. Sector-level transition

BOX 1. Scene-setter

Baringa : It's messy, but investors will find a way[7]

Market development perspective on where investment will flow and whether there are the right metrics:

▪

"It's messy out there"; it is no longer a market where:

~

Government tells investors what to invest in;

~

The wholesale power / energy markets give a clean price signal to provide guaranteed IRR (rate of return);

~

Projects are large and "beautifully" structured.

▪

There is a move underway towards taking merchant risk in power markets: different routes to market (RtM) are available.

▪

This will require a fundamental shift in the way lenders/bankers assess projects.

▪

It is not possible to predict the 'cleantech' market: it is constrained by the amount of finance available for a given RtM and a given risk profile and the number of projects available.

▪

Investors want to invest: they will find a way, within a policy framework, where there are value pools and structures that deliver returns and they take a view that investments will be remunerated across five-, 10-, or 15-year periods.

▪

The key value pool now resides with consumers rather than government.

[7]Experienced energy sector consultants, Baringa.com.

3. Sector-level transition

Context and discussion:
sector transition and investing: where are we?

As new technology, digitisation and cost reductions line up to drive 'sector transition' in energy, transport and infrastructure, there is no single way to set policy (or to invest) to make this work at an accelerated pace – the transition involves a diverse set of assets and issues facing developers and investors.

> *"We're 20 years in to a 50-year transition and the last 20 years were the easy bit."*

Timeframe: investment is 'filtering in' to the newer, more innovative, technologies that underpin the energy and transport transitions. There are multiple different investment options (e.g. different scales, speeds and models of electric vehicle (EV) charging infrastructure) – making it dynamic but more complex and "a bit wild west" at present as these models are tested in the market.

One central question is how assumptions about being 'on track' can be assessed: given this dynamic context and the overall pace and scale of investment needed to decarbonise, is this about waiting for the market to evolve?

▪ In practice, there is no straightforward answer on how to assess progress along the transition. However, there is more time to evolve business and finance models for technologies early in market development, where the 'sector' is less set.

▪ Attention is required from Governments on how newer sectors interact and influence pathways to decarbonisation – as new, sector-focused scenario work illustrates[8]. This clearly illustrates that this is not something that can only be left to the market.

▪ For more mature segments (e.g. solar and wind) keeping track of and anticipating barriers for further scaling is important as funding issues may be more immediate. Although there are fewer new variants to consider for better-understood technologies, scale-up may be constrained by policy, policy change, regulation and overall power system developments (including infrastructure and network regulation, costs and charging).

▪ There is a live debate in Europe over the extent to which merchant risk can be taken (revenue models with exposure to whole sale power prices) and the availability and scale of other ways to sell power, 'routes to market', including via corporate power purchase agreements (PPAs).

Investment and policy realities are changing

Investors are moving from 'historic' model of renewable energy (RE) projects with (individual assets, fixed locations and government contracts or incentives) to a world with multiple moving parts. These span across technologies, policy and regulation, the shift away from fixed price support, more uncertain wholesale electricity price assumptions and more complex revenue models.

This means that raising funds for newer technology or business sub-sectors requires a different kind of conversation to build the investment case with potential investors in those funds. This case can be made, but it is often more complex than the earlier phase of more standard RE project finance: it is no

[8]For example, the Bloomberg New Energy Finance, Eaton and Statkraft reports on UK and German markets: 'Flexibility Solutions for High-Renewable Systems', 21 November 2018. URL: https://about.bnef.com/blog/flexibility-solutions-high-renewable-energy-systems/

longer certain that a specific project pipeline, regulatory environment or rate of return can be identified for a given timeframe, notwithstanding the underlying demand growth case.

There is positive reinforcement, however, as previously niche areas, like ESG (environmental, social and governance) reporting and investing, move into the mainstream, helping to expand the pool of capital interested in green-aligned assets and beyond. On the fund-raising side, integrating ESG factors is now essential for progressing many investment conversations, not least in the expanding universe of institutions interested in investing in assets with strong ESG impact.

For policymakers, one avenue is to understand what kind of data and reference points are being used by investors at the front end of building this kind of investment case. This may help understand and monitor progress and changing assumptions in this dynamic area.

Indeed, if this period of sector transition is characterised as an 'interplay' between policy and innovation , this reinforces the need to pinpoint the critical areas for exchange.

3.1. Sector-level transition - transactions, metrics and tracking 'infrastructure'

Infrastructure asset class, real infrastructure and tracking

The infrastructure investment class is not synonymous with real world infrastructure, even though they are often conflated. From an investment perspective, 'core infrastructure' traditionally means large projects, such as transmission grids, roads and hospitals, with government-backed contracts and inflation linkage offering low risk, long-term, year-on-year yields.

This category has been expanding and now includes larger operational renewable energy projects using mature technologies under the right conditions. Stronger competition for investing in infrastructure assets is reshaping how much risk will be considered (e.g. investing during construction).

However, as described, the current challenge for low carbon is that 'real things' need to be replaced, retrofitted or built in the real economy and they are at very different scales.

"Size dominates the infrastructure investment class. However, in reality, some solutions to climate are incredibly small, others incredibly big".

Tracking and monitoring project-level developments is fairly straightforward for large projects at traditional infrastructure-scale, or projects supported by specific policies. However, other parts of the economy need to be included, including smaller-scale, newer businesses and technologies and 'hybrid' combinations (renewables and storage; vehicle-to-grid infrastructure), buildings and even land-use.

Two examples of tracking activity along the project cycle:

- The UK's regularly updated Renewable Energy Planning Database (REPD) monitors renewable electricity projects at pre- and post-consent stages (1MW capacity and above). From 2019 this will change to quarterly updates at greater granularity: RE projects from 150 kW and also storage projects for the first time.

- The Infrastructure and Project Authority produces a National Infrastructure and Construction Pipeline that tracks public and private projects at a size of £50 million and above. It can incorporate newer technologies at small-scale but only if data is available and in a form that can be aggregated up to the £50 million threshold.

This illustrates the value in identifying sources of data that are available (or indeed missing). A key issue is whether or how these can form a useful 'dashboard' for monitoring the scale and speed of activity during dynamic sector transition.

Tracking transactions alone may not move the dial

A challenge for forward-looking metrics for policymakers is that monitoring investment activity and appetite will not itself 'shift the dial' for the 'high delivery risk'/unrealised market segments.

The note of caution is that financiers are transactional and focused on the immediate pipeline of investment opportunities. This may define views on what looks attractive in the short term (for example, onshore wind, where there are clear routes to market).

For the higher risk or harder-to-reach segments, this means specific attention should be applied to the role of policy and the market/investment responses anticipated in response: structured engagement with the relevant pool of investors will help check the assumptions underpinning the policy approach, policy design and whether investment per se is a barrier.

Systematically keeping track of market sentiment in the more mature sectors also remains important, for example to pick up changes in wider conditions that can impact outcomes. One specific issue noted is whether too much risk is facing projects that are already taking merchant power price risk, such as onshore wind/solar. This raises a flag on the prospect of refinancing risk if conditions change (e.g. in the mid-2020s).

The above example reinforces the importance of designing the pathway out of subsidy regimes: if it is too abrupt, or based on politics or one factor alone, there could be impacts down the line.

Capturing these issues or risks in a structured way will help policymakers avoid unintended consequences and build transparency for investors. Building this into decision-making - alongside economic assessment of policies for example - would help to make this more systematic.

[9]As described by Michael Liebreich, Founder and former Chair of the Advisory Board, Bloomberg New Energy Finance, at IEA's Big IdEA's event, 18 September 2018. URL: https://www.youtube.com/watch?v=zUdFM4Kq78E.

3.2. Sector-level transition: energy efficiency, scale and green metrics

Energy Efficiency: a priority abatement challenge

Energy efficiency (EE) is perennially at the top of the priority list for policymakers, but has proved challenging to deliver.

The EE space (energy savings), although not new, is complex to finance. By way of example: a savings project for one host, can involve multiple technologies over multiple parts of their operations and that has to get to a scale that will interest energy financing institutions. Scaling this example for multiple hosts, to create a larger investment opportunity, requires a careful assessment of counterparty risk for each new host even under the same model.

- Structuring standalone ESCOs (energy saving companies[10]) that commonly offer services to reduce energy demand in return for a share of the expenditure saved on energy bills) and making energy-saving performance contracts investment grade is known territory, but complex, and that complexity has not changed substantively in 25 years despite the theoretical case being very attractive.

- In Europe, active, detailed work has been done with the financial sector to tackle financing barriers and market experience with risk, including 'DEEP' – De-risking Energy Efficiency Platform' – an opt-in repository and source of data for existing projects in buildings and industry sector[11].

However, faced with an ESCO or a new tranche of offshore wind, investors will tend to go for the latter:

"It is true that investors will find a way in, but they will find the easiest way in".

- Responding to this challenge, new funds are emerging to enable institutional investors to more easily invest in operational energy efficiency projects[12].

- There is also an expanding universe of newer demand response businesses, for example, using smart controls and software to adjust demand that is flexible (including for example automated adjustment to non-essential devices, processes and building controls). This can also offer power balancing services into the grid as renewable energy generation introduces more variability to the power system.

Green ratings are interesting for EE: Applying a green impact rating to (a diverse range of) EE policies could offer another way to simplify this value element of doing energy efficiency. A strong green rating for a project or portfolio could improve the investment case and attract institutional capital. This could evaluate individual projects for investors (as is starting to occur, see Box 2, below) or evaluate the green or sustainability outcomes associated with

[10]Energy saving companies commonly offer services to reduce energy demand, e.g. for commercial or industrial companies, through an energy performance contract, in return for a share of the savings on energy costs.
[11]Under the auspices of the Energy Efficiency Financial Institutions Group (EEFIG) - http://www.eefig.com/index.php; De-risking Energy Efficiency Platform - https://deep.eefig.eu/.
[12]For example, Sustainable Development Capital Energy Efficiency Income Trust (SEEIT), www.sdcleeit.com

the policy itself, against its local baseline.

The high level of transparency that comes with an energy savings-based financing structure should help underpin this.

New and small-scale

Smaller-scale newer investments can be more complex for both investors and government. Policy played a significant role in taking elements of risk out of early solar, onshore and offshore wind developments across Europe (compare 2007 costs with 2018 auction values) and, as described, attention is now needed on today's early stage or difficult to finance technologies – EE, energy storage, EV charging – to get 'the next wave' of investment going.

This will need to identify and target actual barriers for a wider ecosystem of potential investors (from individuals and community scale to institutional capital). This underlines the importance of new, more direct approaches to consultation between policymakers and stakeholders to ensure engagement occurs with the right actors, especially if they are smaller and fragmented across the market, to identify issues as they arise.

Green value-add more broadly?

As with EE, one area identified for further testing is whether an explicit green value can be calculated, related to the national or local policies or regulations, and the extent to which this would make a difference in raising capital for these newer or harder to reach market segments.

4. Green
finance / evaluation

BOX 2. Scene-setter: S&P Global Ratings

S&P Global: metrics that can help inform policy?

Infrastructure Credit Risk

▪

Credit metrics can offer a proxy or indicator for the strength of policy and infrastructure strategies.

▪

European offshore wind: a 24GW pipeline has been assessed against various factors. S&P want to understand the limitation to financing under different regimes.

Regulatory risk of different support mechanisms is a 'modifier' in the rating process due to the potential impact on tenor + cost of capital). Features of the current market include:

~

An appetite to finance beyond the end of a subsidy regime;

~

The emerging use of labelled green bonds for post-construction refinancing.

Green Evaluation Service

▪

Assessment of the environmental contribution of financings is underway: 34 individual examples have been completed representing $40 billion of debt evaluated*.

▪

Evaluation methodology includes:

~

Governance and transparency of the transaction;

~

Quantitative net benefit calculations for mitigation or adaptation (a resilience benefit ratio) against local baselines;

~

The context of a technology sector's contribution to the 20C goal.

▪

Ratings: E1-E4 Mitigation (E1 is highest impact)
R1-R4 Adaptation (R1 is highest impact)

4. Green finance / evaluation

Aligning financial flows with long-term sustainability

Investment into projects and sector infrastructure is being made in the context of multiple efforts to accelerate the 'greening' of the financial sector. Ahead of the Paris climate negotiations, Bank of England Governor Mark Carney warned that climate change fundamentally threatens financial stability[13]. Indeed, under the Paris Agreement, governments agreed an objective to make 'finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.'

On the supply side of capital, the challenge is how to align the trillions of dollars of financial flows with long-term climate change solutions in the timeframe required, and how to signal the value in doing that and the risks inherent in not doing so. Initiatives in this area are being lead under the banners of 'green' and 'sustainable' finance but, ultimately, this is about the operation of the whole financial market. Areas in the spotlight span disclosure, financial regulation, fiduciary duty, as well as specific instruments like green bonds.

Evaluating green: monitoring actual investment is difficult

Getting data on an absolute basis is extremely challenging. To get its 'green evaluation' work underway, S&P Global use a database (Trucost) and a 'proxy' methodology based on a relative approach to quantify the green impact of individual investments (see Box 2, above) as well as calculating a resilience benefit ratio (producing both 'E' and 'R' ratings).

Data and information are key

A comprehensive macro-scale approach would be to take the overall volume of capital being invested (across debt and equity) and measure and track "what is coming in and where it is going" to sharpen the ability to differentiate on the basis of green or brown impact.

For near-term policy implementation, being able to capture data on capital that is currently able to invest in the 'high delivery risk'/ 'gap' parts of the CCC's graph (Graph 1) will help understand what drives developments in those sectors. The potential to add in green impact and liquidity (alongside assessment of the underlying assets) can be assessed in this context.

Green not brown: reward or penalty?

There is a live debate on approaches to rewarding green, penalising fossil fuels/high carbon, or both across the financial sector.

"Should VW be writing the National Health Service a cheque as it produces a negative externality that is not being covered?"

Other features of this debate:

- Of the paths forward, a 'more likely' outcome is that the market will price green and relative 'greenness', to a point where there is a market incentive for companies to shift capital. This is just starting to emerge, albeit slowly (e.g. in the green bond market) but not yet consistently.
- Standardising models and taxonomies for green

[13]Mark Carney, Governor of the Bank of England, speech: 'Breaking the Tragedy of the Horizon – Climate Change and Financial Stability'. URL: https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability.

impact is an area of expanded international activity and approaches are gradually converging led by market and government initiatives (e.g. on the government side the EU's Action Plan on Sustainable Finance[14] and the joint work by the China Green Finance Committee and the European Investment Bank linked to creating a 'common language' for green finance[15]).

- However, this may not be enough: longer-term risk associated with a high-carbon business model is not yet being factored in or priced adequately. Developments beyond divestment or fossil fuel exclusion by individual funds are anticipated - from direct regulation to corporate liability (currently being tested in lawsuits, for example).
- Another growing trend being observed is pressure on companies and pension fund trustees from the public to move up the E or R ratings; this is anticipated to increase.
- One important development is a growing network of central banks leading the exchange on climate-related risks for the financial sector and the development of green finance[16]. Early advances in some countries, for example France, are noted and attention is increasingly turning to risk weightings and the role of financial regulation.

The underpinning data linked to market pricing may take 10 years to emerge in one view. However, debt in long-term infrastructure assets is already at risk of impairment under this timeframe, if assets are on the wrong side of the carbon shift. This is a risk that investors need to understand now.

[14]The EU's Action Plan on Sustainable Finance (the official response to the High Level Expert Group, HLEG process) includes a proposal for a regulation to establish a framework to facilitate sustainable investment by creating a unified classification system ('taxonomy') on what can be considered an environmentally sustainable economic activity. This is described as a "first and essential step in the efforts to channel investments into sustainable activities". [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en]

[15]See for example: http://www.eib.org/en/infocentre/press/releases/all/2017/2017-311-joint-white-paper-by-china-green-finance-committee-and-eib-set-to-strengthen-international-green-bond-market.htm

[16]The Central Banks and Supervisors Network for Greening the Financial System, see statement, December 2017: https://www.banque-france.fr/en/communique-de-presse/joint-statement-founding-members-central-banks-and-supervisors-network-greening-financial-system-one

4.1 Resilience and adaptation finance

Adaptation and resilience – even greater market failure and need for metrics

There is an even stronger market failure in finance for resilience and adaptation to the physical impact of climate change itself compared to financing climate mitigation.

- Asset owners are increasingly concerned about the exposure of long-term, illiquid, investments to the physical consequences of climate change and better information is needed to help inform their allocations in terms of resilience.

- Work on how to bring analytics from insurance and reinsurance across to the mobilisation of capital into this area is starting to be undertaken within the insurance sector and there is a significant need for metrics at different levels:

- Systemic resilience metrics: the extent to which a national infrastructure network is able to withstand extreme events and enable business/social continuity.

- Projects: metrics that contribute to the significant potential to inform the 'capex-opex' relationship (e.g. infrastructure projects). This is in terms of capital expenditure, capex, to increase resilience and reducing the costs or operational expenditure, opex, of climate-related impacts on operations (e.g. in buildings and transport).

- Financial institutions: defining the metrics needed to inform investment targets of firms allocating capital.

Need for a capital market instrument?

Until resilience is properly appraised, and rewarded, one argument is that a specific capital market instrument is needed for a transition period.

Such a financial solution would better inform the exposure in a project and therefore sustain that project in the transition until physical climate risk is properly embedded in all of the mainstream credit rating methodologies.

One capital market instrument being given increasing attention is the potential to use Resilience Bonds. This combines credit risk and the cost of insurance: both the investment in resilience and cover for cash flows that might be impacted by physical climate risk. In turn, this has the potential to positively impact the bankability of projects.

Context: what is a Resilience investment, what is Resilience infrastructure?

This is an important area of development within the financial sector and at this early stage there are initiatives[17] and open debates:

- Is resilience an element of an investment or a theme across investment?
- Is resilience 'consumed' or 'delivered'? In less abstract, more analytic terms: how does an investment deliver resilience in terms of ensuring business/social continuity and/or how it is 'consumed' i.e. capex used to invest in securing that resilience.

[17]For example, the investment-led Global Adaptation and Resilience Finance Working Group (GARI) https://garigroup.com/; the Global Commission on Adaptation, URL: https://gca.org/global-commission-on-adaptation; the Climate Bonds Initiative's Adaptation and Resilience Expert Group, URL: www.climatebonds.net.

4.2 Sustainable Finance: TCFD, resilience and sector-level climate policy

TCFD: integrating Resilience and Mitigation

The Taskforce on Climate-Related Financial Disclosure (TCFD), set up by Michael Bloomberg and Mark Carney, was charged with setting up a voluntary framework to help companies and financial institutions to understand and disclose climate risk in their annual reporting and accounts.

The TCFD has triggered conversations on the detailed understanding and measuring of climate exposure on the balance sheet: the framework covers reporting on both transition risk, as policies and sectors change, and physical climate risk.

This is contributing to a "very symbiotic and growing case" for tackling resilience and mitigation together – combining scenario analysis with portfolio carbon intensity.

Integrating different analytical frameworks is also being examined in another study (not yet public) looking at how to bring climate scenarios together with long-term energy system modelling out to 2050 – to see if it is possible to stress test scenarios from a disclosure reporting perspective.

Pooling expertise across institutions is seen as essential for this new kind of integration exercise.

Circling back to finance and policy

Timing and scale are key issues for climate policy and differentiate it from other, even complementary clean energy, new transport policy or health drivers such as air pollution.

The role of government/policy is still seen as central, albeit diverse: "Policy is huge". There are opportunities and capital but to deliver outcomes against a timetable the policy regime is needed to "tilt the whole playing field" – and more acutely since the IPCC 1.5oC report.

This remains the case even as technology cost-competition is being reached and multiple new technologies enter the market. As well as setting overall objectives, policymakers have to both lead and respond to a dynamic situation at 'system level'. This requires addressing: barriers in regulatory conditions designed for 'old', more centralised systems; the infrastructure and planning to foster new sector growth; unanticipated barriers and risks as sector 'boundaries' change; as well as catalysing the harder to reach sectors and ensuring all parts of society are served.

There is an increased need for integration, not least across silos of policymaking.

4.3 'TCFG' – Climate-related Finance for Governments?

In this landscape of complex and intersecting systems change, tackling delivery risk on climate will require going beyond investment metrics' and structured engagement to look at whether 'investment' is embedded and optimised across the system of decision-making itself.

The TCFD framework (to embed and integrate climate risk into the operations of companies and financial institutions) is a surprisingly relevant structure also for Governments – potentially helping to embed and integrate investment into policy decision-making and analytic frameworks.

This approach could help get to the 'right answer' for mobilising capital at the right resolution of detail, faster, and enable monitoring that to ensure it is on track. This means, for example, developing investment-relevant analysis alongside the traditional economic analysis that generally underpins policy decisions.

The 'investment confidence' of a government (national or sub-national) involves aligning policy objectives with policy tools and calibrating its role in the context of the realities facing the ecosystem of potential investors. This means the relative risk/return and opportunity costs (other options or places to invest) ~ including for those driving new project/business development.

The 4-part TCFD framework covers:

- **Governance:** how low-carbon investment is integrated into decision-making across government/departments7.

- **Strategy:** is low-carbon investment a cross-economy priority; have policies and plans been tested with those anticipated to invest or respond?

- **Risk Management:** have risks to meeting goals been identified and mitigated?

- **Metrics and Targets:** are there metrics or analytic approaches in place for monitoring?

The original TCFD framework is set out against this re-configuration for governments – see Annex 1, below.

Some elements of the four-part TCFD framework will very likely already be in place within governments: for example in regulated sectors, dedicated public finance institutions or pockets of 'in-house' finance capacity.

Pooling expertise across parts of government is starting to occur: the UK, as one example, has a senior civil servant group involving those with financial expertise across different departments. Other governments are leading with dedicated top down Cabinet coordination across Ministers with relevant portfolios.

There are also good models for effective and structured engagement with financiers during policy design[18], and indeed the central question of this work (are there metrics for systematically monitoring policies?) originally emerged when considering early proposals of the EU Governance process in 2017[19].

Fundamentally, this cuts across treasury, national sector-specific departments (power, heat, transport, infrastructure or industrial) and those responsible for weather disaster or physical risk. Arguably this involves all other parts of government from planning and agriculture to health, employment, education and the movement of people.

Embedding and systematising investment analysis within government in a transparent way should lower risk for both investors and governments and paves the way for scaling up climate actions more effectively and at greater pace.

EU Governance – early framing

The EU's new Governance Regulation – creates a legally enforceable framework for member states to set out their National Energy and Climate Plans (NECPs)[20] to meet agreed climate goals. This is an opportunity to incorporate investment-related assessment during policy design: testing investment assumptions being made in plans and policies with those investors anticipated to respond. With structured monitoring of whether that investment is on track, this would enable policymakers to identify emerging gaps or barriers and mitigate those, including with additional public finance or resourcing. The 'monitoring progress' element of this raised the original question behind this paper – what metrics or leading indicators to use when examining whether plans are on track for delivering outcomes – the investment element of that.

The schematic below illustrates how this could work.

1. Clarify assumptions
- Is policy* designed to attract private capital (ambition & scale overall & sector, projects)?
- Which sources of capital are intended to respond?

2. Test those assumptions
- Ex-ante: involve relevant capital providers from across the finance spectrum
- Identify wider barriers and gaps that need public finance tools
- Are plans coherent & system-wide?

3. Embed in Regime
- Systematic monitoring, reporting on policies/plans against investment objectives (including the effectiveness of resources being used to fill gaps e.g. public finance).

Using the TCFD outline, this could be more comprehensively framed as:

- **Governance:** Ministerial leadership, 'whole of government' scope, in-house finance capacity or access to that capacity;

- **Strategy and Risk Management:** structured engagement and testing during policy design stage (above) for example setting up low-carbon investment platforms for engagement and access to data; and

- **Metrics** for monitoring and assessment (structured assessment of whether investment is on track).

[18]For example, the Low Carbon Finance Group set up by leading London financiers during the Electricity Market Reform process; and the Energy Efficiency Financial Institutions Group (EEFIG) in the EU.
[19]Submissions to this process and an invited presentation at the European Parliament are available from the author.
[20]https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union

5. Conclusions: decision-making and metrics for getting to scale, faster

5. Conclusions: decision-making and metrics for getting to scale, faster

As governments – whether national, sub-national or local – face the pressing challenges of implementing and ratcheting up climate policies, the focus on investment will only increase in importance.

The sheer magnitude of the 1.5oC challenge makes it difficult to see how this can be achieved without a more fundamental rewiring exercise across economies, communities and governments to build a much deeper, more rapid and more resilient response to climate change in the context of wider sustainable development goals. This is a condition to drive scale faster.

This preliminary exercise was about finding systematic ways to integrate 'investment' considerations across the mechanics of decision-making in governments to create an agile and systematic 'early warning' of risks to investment and enable a rapid response to those.

One important reminder is the broader and often challenging context of delivering a national infrastructure portfolio: this goes beyond green finance and clean energy and involves significant legal obligations and interests around public investment. As one policymaker quoted at the roundtable:

"Policy is akin to carrying out open heart surgery on someone walking down the road. It's not as simple as a good idea with metrics behind it; many other considerations are in play: value for money, politics and so on."

Lower risk for Investors and governments

Each jurisdiction – national, city or sub-national, or regional (cross-border) – will have its own context, priorities and drivers in sectors, even as they grapple with national climate plans under the Paris Agreement, or the SDGs. Where governments seek private capital to deliver outcomes, consistent, transparent and responsive decision-making framework can make that moving landscape lower risk for investors as well as lower risk for governments.

Recommendations

Three areas for further attention came out of this work: a further 'deep dive' around risk assessment processes with some real-world testing, and at a systems or 'landscape' level for governments themselves. These will involve expertise pooling and indeed feedback on this working paper is welcomed.

1. Deep-dive: can a structured risk assessment process help policymakers?

Practical tools: further examine the process and relevant components used for risk assessment and stress testing by investors to develop a framework for assessing the risk factors for attracting capital within the policy framework itself ('delivery risk'). This could be used at both policy design stage and for monitoring implementation to help identify the key risk factors to securing investment in a systematic way.

A next step is testing this against real world situations to ensure it is of practical use. Examples would also test:

- How to provide insight in a landscape of multiple smaller-scale, new technologies entering the market in this 'innovation' period of sector transition harder to reach sectors. Access to data to track those areas will be important;
- How to make this straightforward for poorly resourced decision-making situations e.g. cities and under-resourced governments; and
- Whether a 'dashboard' approach offers a means to lay out information and data that is available but changing at different paces, and in turn inform areas that need to be on the monitoring radar.

2. For investors – evaluation of policies to provide a simplified 'green value' metric?

- Evaluation of sector-level policies for a 'green impact' value line (against the relevant local baseline) to simplify this for investors;
- Whether and how this can attract a wider pool of capital, particularly in difficult to reach but high impact segments like energy efficiency. This is also an opportunity to integrate climate resilience.

3. Bigger picture: 'TCFG' – Climate-Related Finance for Governments

A politicised environment that is difficult to navigate, or not transparent at the level of how changes are made, is higher risk and indeed may simply freeze investment until there is clarity or confidence in the direction.

In this context, the TCFD framework offers an opportunity to systematise various stages of decision-making, along with structured engagement with the relevant parts of the financial ecosystem, to better secure the investment element of delivering outcomes. This should lower overall risk for investors and increase 'investment confidence' for policymakers.

Re-designing the engine

The theme of this working paper – examining whether financial metrics or analytic approaches are transferrable and useful to help governments – sits alongside a number of areas of analytic work that could be characterised as part of the re-wiring of the system to meet the climate challenge.

This has been described as 'gearbox' work (even if that is too mechanical a description for an increasingly meshed and networked age, the point remains) currently separate elements of the financial and policy architecture will need to be able to intersect to work better or more systematically together at an operational level to facilitate delivery and scale-up.

To deliver outcomes, things have to actually work on the ground, so we have to get under the proverbial bonnet (or hood). It may be with software rather than oily hands, but this is about the practical end of connecting things up: we have to move, faster, even if the terrain is uncertain and we don't have a map of the exact path ahead.

As the re-tooling of the finance sector gets underway to produce longer-term, more sustainable outcomes, we need to ensure simultaneously, that governments themselves – whether national, state or city - have the tools to get to the right level of granularity for investors, faster, to secure delivery of the needed investment on the ground.

Infographics

Annex 1. Can the Taskforce on Climate-Related Financial Disclosures (TCFD) helpgovernments?

The schematic below is from the summary of the final report of the TCFD illustrating their structure for embedding climate risk into the decision-making of a financial institution.

The slide that follows shows a 'side by side' of this approach re-written for governments.

Background: TCFD* framework – integrating climate risk for financial institutions

Governance
The organization's governance around climate-related risks and oppurtunities.

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.

Risk Management
The processes used by the organization to identify, assess and manage climate-related risks.

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

From "Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017)". URL https://www.fsb-tcfd.org/publications/final-recommendations-report/

TCFG: Climate-related Finance for Governments?

TCFD Framework:

Governance
The organization's governance around climate-related risks and oppurtunities.

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.

Risk Management
The processes used by the organization to identify, assess and manage climate-related risks.

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

Integrating 'investment' into Government decision-making

Governance: is a structured assessment of low carbon investment integrated into decision-making across Government /Departments?

Strategy: is low carbon investment a cross-economy priority? Has the investment strength of the climate [NDC] and sector level policies been tested and in the context of a medium and long-term plan?

Delivery Risk Management: is there a process in place to identify, assess and manage the specific risks to meeting policy goals at the right granularity of detail for investors (and linked to policy design assumptions)?

Metrics & Targets: are there processes and metrics in place to assess, monitor and respond to whether investment is on track to meet goals.

Governance

Integrating Paris-compliant low carbon investment across government decision-making

- [Board / Ministerial level or equivalent] Is there a Head of Government-led, cross-department governance process for securing low carbon investment?
- Is there a structured process for engagement with lead capital providers and investors on strategic market factors and developments?

- [Management] is there senior in-house finance capacity in lead departments?

- Are there processes in place to ensure that delivering low carbon investment is fully integrated into decision-making for the whole economy (including budget and regulatory responses to risk factors)?

Strategy

- Is securing LC investment a cross-economy priority with a long-term plan?
- Delivery: has the 'investment strength' of the overall climate strategy and its sector-level elements been tested?

- Is Paris compliant
- Have the risks to and opportunities for investment linked to sectors and systems-relevant objectives been identified?

- Does the design of policies and tools respond to those risks? Have investment assumptions been tested with capital providers anticipated to respond? Is resilience integrated?

- Are Treasuries, DFIs, central banks on board?
- Is this integrated into overall economic and development planning?

Delivery Risk Management

Delivery risk: have risks to meeting goals been identified, assessed and managed?

- Is there a structured process in place to identify and assess risks to securing the investment assumed in the design of policies?

- Is there a process in place to respond to specific risk factors in a timely fashion (including budget and regulatory decision-making)

- Integration: is there an assessment of unintended consequences from other government strategies?
- Are the risks and opportunities from climate policies and climate impacts in the overall economy being identified and managed?

Metrics

Is an investment monitoring process in place? Are metrics in place to assess whether investment is on track to meet short and long-term objectives?

- Qualitative: Is there a structured engagement process in place with the relevant ecosystem of investors to enable monitoring in line with strategy and delivery risk management; covering policy specific and external impacts on investor confidence, appetite, gaps and external conditions;

- Quantitative: Have metrics or leading indicators been identified and are these being used in a structure process to assess the forward investment environment, including the development and early stages of the project cycle?

- Outline the feedback to strategy and delivery risk management.

Author biography
Kirsty Hamilton

Author biography

Kirsty Hamilton

Kirsty Hamilton has led initiatives working with leading low carbon finance practitioners to bridge the gap with policymakers over the last 15 years, focusing on 'investment grade' policy conditions for renewable energy and the broader new low carbon energy sector. She set up and led the Renewable Energy Finance Project through an affiliation with Chatham House in 2004 (UK, EU and internationally focused) to foster 'active understanding' through direct engagement between senior transactions-focused energy financiers and policymakers. From the outset, an aim was to bring this 'bottom-up' project-relevant evidence-base into international debate.

Following the financial crisis, she was a Director and involved in the establishment of the first-of-its-kind Low Carbon Finance Group (2010-2015) founded by senior energy finance practitioners (across debt, equity including infrastructure and specialist advisory) to factually assist policymakers to understand conditions to attract capital to low carbon options at greater scale. It worked extensively on the UK's Electricity Market Reform (Ministerial and Departmental level) and relevant EU debates, illustrating the often granular intersect between project risk & return and policy & regulatory frameworks.

She went on to become a Specialist Advisor to a UK Parliamentary Inquiry into Investor Confidence in the Electricity Sector (2015-2016). Following the UK Brexit vote she did further evidence-based work on how this might impact low carbon investment, giving evidence to Parliament. She also does Advisory work, recent clients include: OECD, Climate Finance Accelerator, International Energy Economics and Finance Association (IEEFA), Imperial Business School Centre for Climate Finance & Investment.

She has close to 30 years of experience in climate and energy policy, and has held invited advisory roles at the World Economic Forum, UNEP Finance Initiative, REN21 and has been an expert reviewer and contributing author to the IPCC.

Finance Guide for Policymakers

2016: 'Finance Guide for Policymakers', published by Bloomberg New Energy Finance with Chatham House and UNEP-Frankfurt School. A factual reference guide to who does what and why in finance, relevant for renewable energy and green infrastructure; Foreword by Christiana Figueres. http://about.bnef.com/white-papers/finance-guide-policy-makers

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