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BEIS: Futures Framework

PROSPECTUS[1]

9 June 2023

About CEPA

Founded in 2001, CEPA has grown to become a global economics, finance, public policy, competition and regulation advisory firm. Our strength is advising about matters where economics and public policy overlap.

We operate through our offices in the UK and Australia. Our consultants support clients' complex decision-making by providing robust analysis, which is commercially astute, innovative and frequently relied upon by governments and the public sector, multinational organisations and private companies of all sizes.

We have worked on more than 1,000 projects to date, gaining experience in 50+ countries, with our analysis drawing on extensive expertise from our core sectors of:

- energy;
- water;
- transport;
- infrastructure;
- global health; and
- communications and media.

Our approach is tailored to meet the specific needs of each client and from the outset of every potential assignment, we invest the time and resources that are necessary to fully understand the context, scope and objectives of the project. Our up-front investment of time allows us to form the best possible team to provide some of the most highly sought-after analysis available, that our clients have come to expect.

In addition to the expertise of our staff, we draw upon our established pool of associates and external advisors to complement our project teams as appropriate. We value our client relationships and strive to provide clear, responsive communication and to be flexible in our approach should things change, or if new questions arise.

To engage our experts, call us on **+44 (0)20 7269 0210** or email **info@cepa.co.uk** to discuss your requirements.

Our expertise

We advise public and private sector clients in infrastructure sectors, namely energy, transport, water, and telecoms. These sectors require the use of methodical approaches to investigating the future, such that well-informed decisions can be made about that future – for example, a large capital investment or planning a long-lived network.

Techniques to investigate the future and analysing the outputs of futures work

As an economics, public policy, and finance consultancy, much of our work involves the application of qualitative and quantitative techniques to develop an understanding of the future. Below are the key (mostly) quantitative techniques we routinely apply within our work, with many of our projects combining several of these methods:

- **Scenario development and analysis** – We often employ scenario analysis as a story-telling technique to convey uncertainty, highlighting the key assumptions that feed into each scenario and affect the outcomes of interest. We find the use of scenarios an effective way of allowing stakeholders to engage in futures analysis. We sometimes use this technique in conjunction with tipping point analysis, e.g. to identify a plausible future scenario where our conclusions no longer hold.
- **Forecasting** – We regularly produce forecasts of efficient expenditure within regulated companies, of supply and demand within markets, of revenues or costs within financial models, or of other metrics such as road safety incidents on motorways. To produce these forecasts, we may extrapolate from historic trends, undertake statistical analysis of relationships with other drivers, carry out comparative analysis of costs of other firms carrying out similar activities, or form qualitative judgements based on an understanding of underlying trends.
- **Market modelling** – We develop and maintain a suite of energy market models (e.g. electricity, gas and hydrogen) that we use to provide analysis for our clients. These market models have been used to answer a wide range of questions, such as testing the security of a country's energy supply (see below), estimating the range of possible revenues from new investments (using Monte Carlo modelling), or testing the economic and social impact of moving to different electricity charging arrangements.
- **Simulation modelling** – As well as our market modelling capabilities, we often develop bespoke simulation models (both deterministic and stochastic) to test, appraise or evaluate different policy or investment interventions. This often also requires making an assessment about the future and incorporating those assessments into our models.
- **Benchmarking** – In our advice to utility regulators, we use benchmarking to ascertain the potential for utilities to deliver improved outcomes for customers. Our benchmarking techniques range from data heavy statistical approaches to lighter touch case-study based comparators.

A selection of our team and their rates

Gary Keane, Partner

Hourly Rate: £343.75

Half Day Rate (4hr): £1,375.00

Day Rate (8hr): £2,750.00

Full biography

Gary has 20 years of experience in energy policy and regulation. He has provided expert advice to a variety of clients on markets and networks projects relating to the transition to a Net Zero energy future by 2050.

He has advised policymakers on different options for supporting the delivery of decarbonisation goals, for example, working for BEIS on the use of price signals to encourage the flexibility in household electricity demand needed to achieve cost-effective decarbonisation. He has also led the assessment of proposed changes to retail and wholesale market rules to facilitate a low-carbon future.

Gary's extensive experience on modelling energy scenarios used in futures work includes advice to National Grid on the creation of the long-term scenarios that evolved into the Future Energy Scenarios. Before joining CEPA, Gary worked at AFRY where he provided clients with long-term price projections for wholesale markets.

Emmanuella Gentzoglanis, Managing Consultant

Hourly Rate: £250

Half Day Rate (4hr): £1,000

Day Rate (8hr): £2,000

Full biography

Emmanuella works extensively within the energy and water sectors on regulation, public policy, strategy and modelling. This includes advising clients on issues related to the energy system transition and the need for policy to evolve in response to new technologies and business models.

She has used detailed market simulation models to test market impacts and project prices under various scenarios. For example, she has led CBAs for proposed new electricity interconnectors to the GB and Irish electricity systems.

Emmanuella provided strategic advice to an infrastructure services company on the key trends affecting the UK energy supply chain. This involved a detailed understanding of the factors generating a need for investment, defining future opportunities, and defining and sizing the value of the market.

Stephen Garavan, Senior Consultant

Hourly Rate: £218.75

Half Day Rate (4hr): £875

Day Rate (8hr): £1,750

Full biography

Stephen has experience working in electricity regulation and policy, working on energy market modelling, researching potential scenarios and providing detailed projections using CEPA's bespoke pan-European electricity market model and global gas market model. He has used this experience to deliver cost benefit analysis and impact assessments for a range of clients. For example, he undertook a security of electricity and gas supply study for the Irish government, and advised a client on the impact of a proposed interconnector on wholesale markets and security of supply.

He also has experience in advising clients on policy issues related to decarbonisation and the transition to Net Zero. He recently worked on an independent economic assessment of differing approaches to delivering an electricity system with high-levels of renewable penetration by 2030 for a European TSO.

Charlotte Hallam, Consultant

Hourly Rate: £175

Half Day Rate (4hr): £700

Day Rate (8hr): £1,400

Full biography

Charlotte has significant experience advising regulators on economic regulation and financial issues using quantitative modelling. This work often relates to the infrastructure needed to support the transition to a Net Zero energy future.

She has experience developing econometrics models, supporting Ofgem on the delivery of the RIIO-ED2 price controls. Part of her work included developing econometric totex benchmarking models which capture the expected shift in DNO activities over the period to facilitate the electrification of heat and transport envisaged as part of the Net Zero transition.

Charlotte has also recently advised Ofgem on design and implementation of incentives under the proposed regulated asset base regime for new nuclear projects. This has included modelling the impact of the incentives on investors and consumers.

Nicolás Achury Beltrán, Research Analyst

Hourly Rate: £156.25

Half Day Rate (4hr): £625

Day Rate (8hr): £1,250

Full biography

Nicolás is an expert in using data analysis to support energy advisory services. His work at CEPA includes creating and testing Python scripts to support the assessment of wholesale electricity market reform options being considered under the REMA programme, the cost-benefit analysis of a new electricity interconnector to GB.

Nicolás is a core member of CEPA's energy market modelling team, which plays an important part in our futures work in the energy sector. Before joining CEPA, he worked for XM filial de ISA, the system and market operator of the Colombian power system, conducting quality control using SQL, and developing forecasting models on timeseries using Machine Learning and Deep Learning with Python. He also worked for the International Energy Agency (IAE), researching strategies for cities to transition to a low-carbon future.

Case studies

Below we highlight examples of projects where we have combined qualitative and quantitative techniques in our futures analysis. Much of our futures work has been around helping our clients, plan for, manage, and adapt to the Net Zero transition. We describe below a recent project, where we have used a combination of futures techniques to gather intelligence about how the Net Zero transition may evolve, and to develop an understanding of some of the underlying dynamics to test potential policy interventions.

Supporting Elexon in understanding whether meter splitting reforms would enable innovation in electricity supply

CEPA supported Elexon to understand whether allowing multiple electricity providers to supply a property through a single meter (labelled 'meter splitting'), would encourage technological or market innovations such as the provision of Heat as a Service or vehicle to grid charging.

We mapped the range of stakeholders using an interest/insight matrix to identify a range of potential interviewees, and then used the 7 Questions technique to gather insights from the stakeholders. We used the semi-structured interviews to identify different potential innovations, understand how different stakeholders perceived that meter splitting (or alternate policies) would help or hinder the development of those innovations, and any lessons that could be learned from the past or elsewhere.

Using the insights from these interviews and from our own understanding of the mechanics of electricity supply, we constructed road maps for each innovation. We mapped the associated benefits and investigated what conditions were necessary to achieve those outcomes. Through a stakeholder workshop, we then tested our initial conclusions around which policy interventions would be most effective.

Through this process, we found that the meter splitting policy was unlikely to be a necessary nor sufficient condition for enabling the innovations we identified, at the timescales required. And as such, given the costs and potential risks of implementing the meter splitting policy, alternative interventions ought to be prioritised in the shorter term. Our analysis and powerful conclusions influenced thinking across industry and academia.

We present below an example where we applied a combination of futures techniques to help a client navigate a future that is subject to significant uncertainty about demand. While this project relates to a short-term future (five years), we consider the techniques would be equally applicable when applied to longer term horizons.

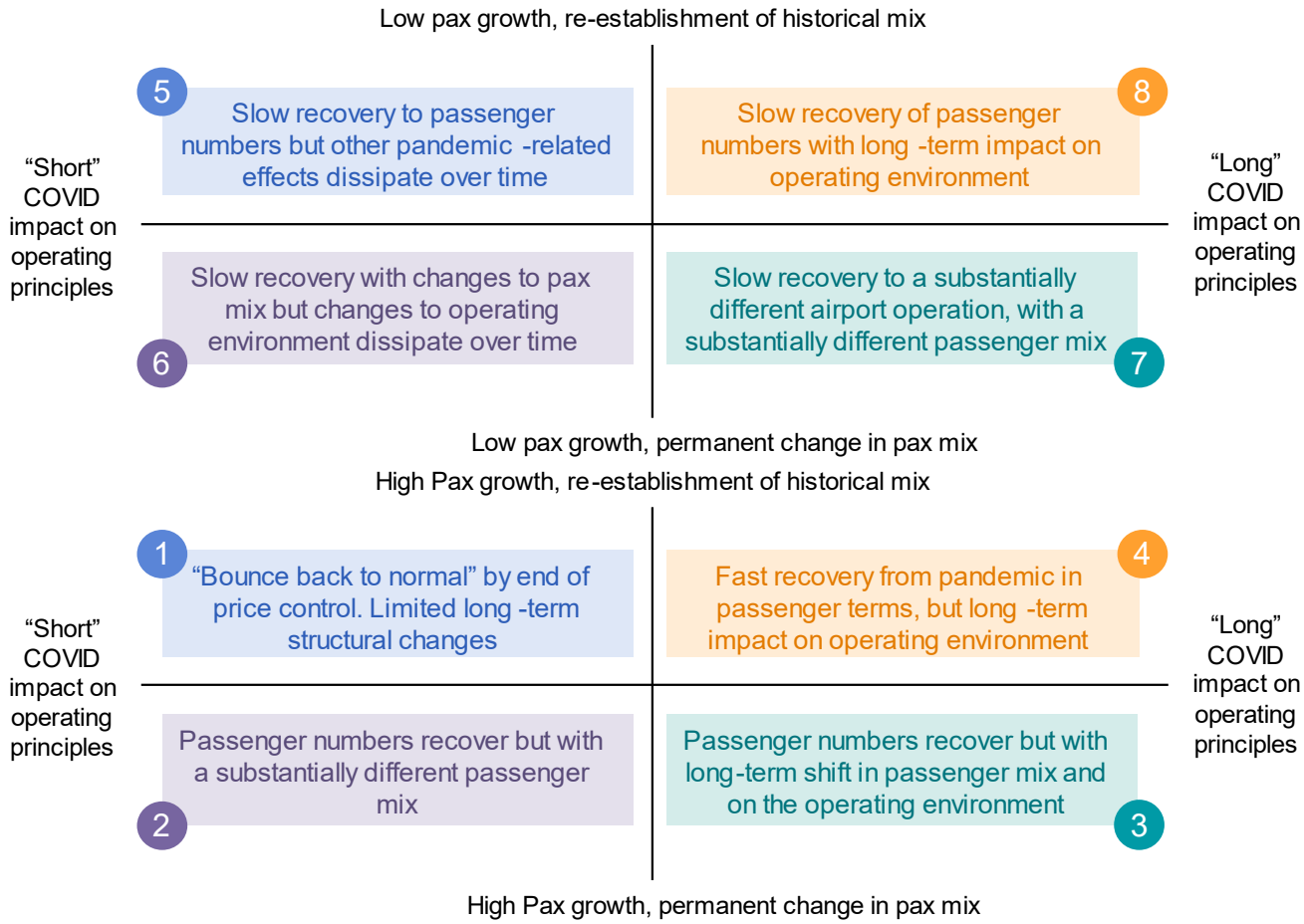
Supporting the Civil Aviation Authority in navigating uncertainty within the aviation sector when setting the Heathrow Airport price control

CEPA has been advising the CAA as it determines the price cap on Heathrow Airport's charges over the next five years. We have been advising specifically on operating expenditure and commercial revenue generation, forecasting efficient levels of opex and commercial revenues over a five-year period.

At the start of the process in 2021, there was significant uncertainty around the long-term impact of the Covid-19 pandemic on the aviation sector. This made it challenging for the CAA to determine how airports ought to operate, what that meant in terms of the costs of running an airport, and the implications for airport charges. The challenges faced by the sector also meant that both airport and airline stakeholders had strong views on what an appropriate price cap ought to be.

CEPA supported the CAA's early thinking by developing a set of scenarios to be used as the basis of discussions for the remainder of the process. In light of the time available, we decided to undertake a desk-based review of grey literature, news material and industry thought-pieces to map different perspectives on how the aviation industry may be affected in the medium term by the pandemic. We then used this to construct three axes of uncertainty that could be used to articulate different states of the world, and the implications of these for airport investments and operations, shown in the diagram below.

we (and the CAA) were then able to use these three dimensions to engage with airport and airline stakeholders, around their views under each state of the world for each element of the airport operation. This prevented stakeholders from cherry picking the scenario most favourable to them depending on the context. For example, while a change in the passenger mix in favour of leisure traffic would likely increase operating costs, it would also increase revenue generation opportunities from retail outlets. This process allowed us to develop a coherent, internally consistent narrative around each scenario.



Within each scenario, we highlighted the key assumptions that affected operating expenditure and commercial revenues, and constructed a forecast based on those assumptions. We also highlighted the key drivers underlying each axis of uncertainty. The development of multiple scenarios helped CAA understand how the opex and revenue forecasts could evolve under different states of the world and allowing them to continue making policy decisions under the backdrop of uncertainty.

Over time, as uncertainty around the future reduced, the CAA was able to select a single scenario with little challenge from industry stakeholders.

Identifying risks and opportunities from futures work

We also use futures analysis to advise clients on other aspects of a sustainable future, such as affordability and security of supply.

Futures work in the context of water and fuel poverty

We regularly advise clients on future risks/ opportunities related to water and fuel poverty.

Water poverty – In a project for the water industry, we used a mixture of horizon scanning and driver mapping to identify trends within the water sector that may influence the level of water poverty. We then mapped these trends against the key drivers of water poverty to develop an understanding of the dynamics of water poverty in the future.

We then used desk-based research to articulate the potential implications of each driver, with deep dives on less well-understood or more consequential drivers. Through this we identified the key risks and opportunities. This allowed our client to understand whether certain interventions were less or more likely to work in the future, depending on whether they worked with or against some of the underlying trends.

Fuel poverty – In the energy sector, we advised a consumer charity on how decarbonisation may affect fuel poverty. We used our prior experience on decarbonisation issues to identify the key interventions required to achieve decarbonisation and used desk-based research to estimate the costs of those interventions. We then constructed some high-level scenarios for how the costs may be allocated to different types of consumers, and then used simulation modelling to estimate and show the impact on consumers that would be considered fuel poor.

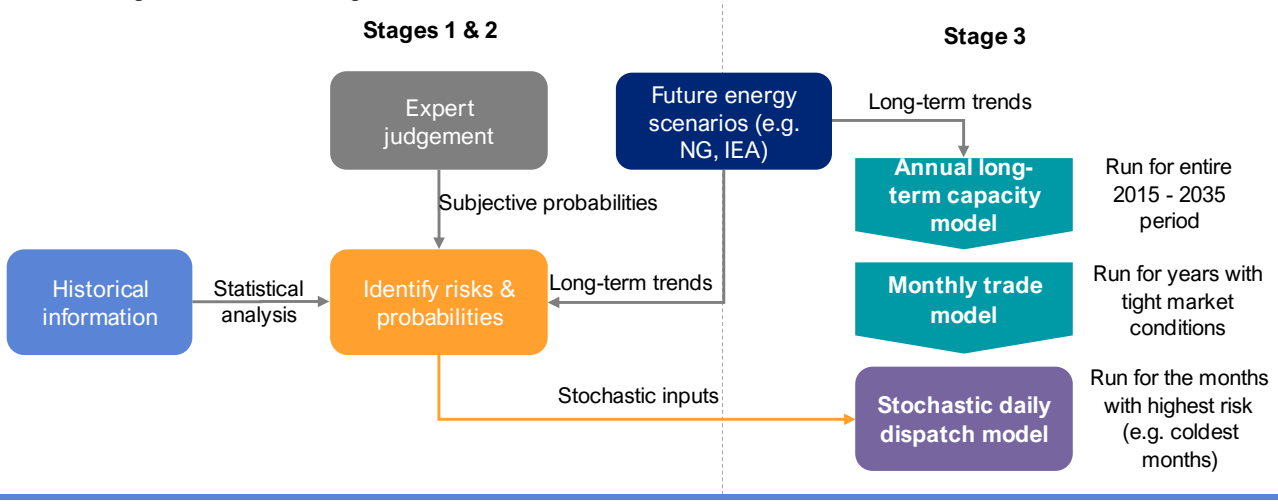
Security of energy supply modelling and other similar market modelling

We advised both the UK and Irish governments on the security of their energy supplies. In these projects we assessed security of supply in terms of the probability of individual risks, the key areas of vulnerability within the energy system, and the impact on the energy system should a combination of key risks occur.

To identify risks and develop scenarios around potential risks, we used a combination of reviews of past security of supply studies, stakeholder workshops attended by a wide range of experts, and analysis of historical data. For the stakeholder workshops, we employed the Delphi method; where participants were invited to identify risks, rank the likelihood of those risks, and then to score the likely impact against a qualitative scale. This was used to inform the development of the scenarios, supplemented by further analysis. For example, we used a Monte Carlo simulation to assess the impact of a severe weather event on energy demand to develop a reasonable worst-case demand shock scenario.

We then modelled the impact of each risk event and the impact of a combined risk events, on the ability of the energy system to satisfy demand, using a stochastic model, as shown below. This allowed us to identify the 'breaking point' of the energy system.

This analysis has provided both governments with objective insights to inform the debate around security of supply, and inform their strategic planning. This has been valuable during the recent energy crisis, as many of the scenarios tested are ones that have come to fruition. It has also allowed both countries to take an evidence-driven approach to an emotive topic. We have been commissioned to extend our work to test the impact of different mitigation measures against the risks we had identified and assessed.



Aligning futures worth with strategic planning

Our futures work often underpins key policy and regulatory decisions by our public sector clients. However, we have also used futures techniques to support private sector clients in their strategic considerations, as demonstrated in the example below. Supporting strategy development by an infrastructure services company.

CEPA was commissioned by an infrastructure services company to provide insights on the key trends affecting the UK energy supply chain, to identify opportunities for growth. We employed the PESTLE technique to contextualise the energy sector transition and the key markets affected by the transition, as well as articulating how current regulatory policy and consumer-led change creates opportunities in these markets.

We then provided deep dive outlooks into the markets identified as of interest to the client. This involved: i) understanding the outlook for the key markets, ii) understanding the "push and pull" factors generating a need for investment and activity in those market, iii) outlining the factor that drive the need and or incentive for investment, iv) defining the potential opportunities that might be over the next decade as well as providing a high-level indicative market size value, and v) identifying the major players in those markets. Our study was used by the firm's senior management to inform their wider business strategy, investment and M&A strategy.

We also recently developed a methodology to support a water company in developing its long-term delivery strategy. Its strategy was required to be ambitious in terms of the outcomes it delivered for consumers, while being cost effective and robust to different futures. The methodology included simulation modelling to understand the impact of individual interventions within the strategy, decision-tree analysis to understand when such interventions could in theory be implemented, and stress testing different investment pathways against a range of common reference scenarios.