Economic Consulting Associates

ECONOMICS FOR INFRASTRUCTURE



March 2018

Worldwide infrastructure economic consultants specialised on energy and water sectors

ECA provides economic consulting advice in infrastructure services for governments, regulators, and investors worldwide

20 years
in business

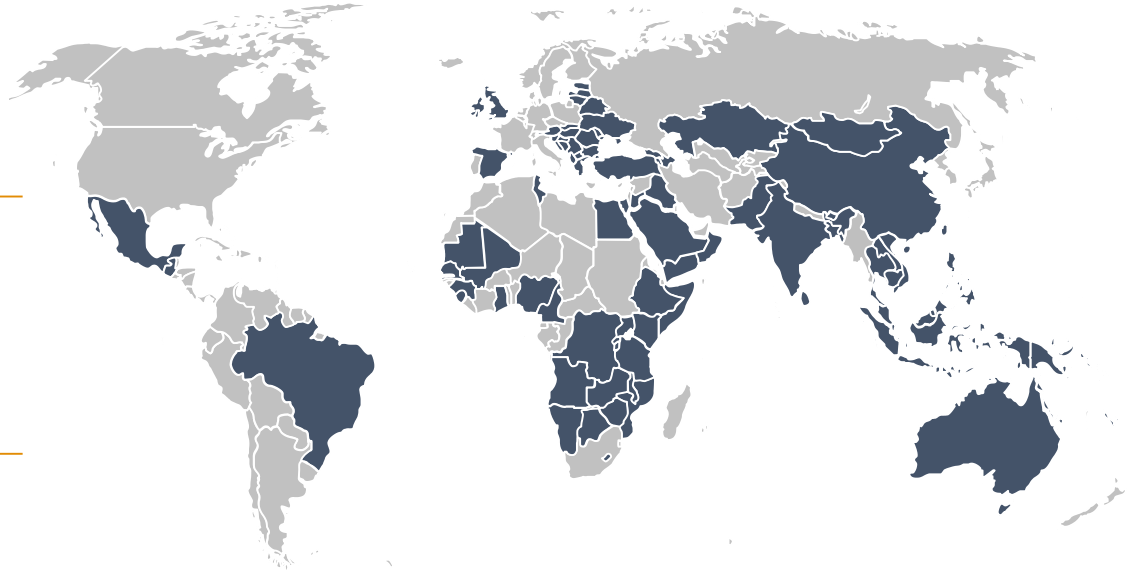
60+
assignments annually

15+ years
average experience

24
Economists

100%
Employee owned

40+
Regulators advised



65+
Countries worked in

3
Office locations

20+
National utilities advised

Economic regulatory and policy advice across eight service areas

1 **Regulatory economics**	Advice to regulators, regulated entities and other market participants on regulatory procedures including revenue setting methodologies, network access and market rules
2 **Pricing**	Developing wholesale and retail tariff levels and structures balancing social and economic requirements on the basis of in-house developed tariff models complemented with dedicated training for tariff principles
3 **Infrastructure policy**	Assisting public sector in formulating long term energy and water sector policies and providing readily implementable sectoral Masterplan strategies to give effect to the policies
4 **Investment planning**	Key services offered to investors in energy and water infrastructures include asset valuation, investment analysis and planning, market risk analysis, regulatory due diligence and macroeconomic impact assessments
5 **Market design**	Expertise in the design of trading mechanisms, market monitoring and renewable energy support systems covering feed-in-tariffs, balancing mechanisms, balance responsibility incentives and cross border access right mechanisms
6 **PPP & commercial contracts**	Introducing private sector participation and competition into infrastructure, from the development of supporting institutional and regulatory frameworks for PPPs through to the design of commercial contractual arrangements (eg PPAs)
7 **Expanding access**	Assistance on the development of regulatory frameworks and suitable business models targeted to the provision of infrastructure to rural areas which includes off-grid electricity options (eg mini grids)
8 **Dispute litigation**	Support legal teams in providing expert witness services across our core areas of expertise on gas and electricity pricing, economic valuations of damages, energy market assessments, energy exports and regulatory issues

Core sector experience in electricity, natural gas, clean energy and water

Specialised advice across the full electricity value chain on regulatory frameworks, tariff levels and structures, power market design, market rules, and investment appraisals	**Electricity**
Support focused on transmission, distribution, storage, and LNG terminals providing services in pricing, sector restructuring, regulatory frameworks, masterplans and quantification of the economic value of gas	**Natural Gas**
Consulting services in renewable energy support mechanisms, grid and market integration, connection arrangements, impact analyses and required market changes, energy efficiency programmes and certificate schemes	**Clean energy**
Assistance in designing water tariffs, developing investment plans, supporting in the set-up of regulators and providing capacity building and training courses to strengthen government and regulator's capabilities	**Water**

'Structured solutions supported by quantitative analysis drawing on conceptual insights offered by economics'

ECA senior experts

RAY TOMKINS
Chairman

Ray established ECA in 1997. His professional career spans 35 years and includes founding the Energy Policy Research Group at Imperial College, University of London and the energy and environment practice at ERM and London Economics. He leads much of ECA's gas sector work and due diligence work.

FRED BEELITZ
Managing Director

Fred is experienced in energy policy issues and infrastructure economics. He covers financial analyses, pricing, energy masterplan studies and regulatory economics. His area of expertise is natural gas markets, where he advised Governments, investors and regulators on a range of economic issues.

PAUL LEWINGTON
Director

Paul has over 25 years' experience as an energy economist. He is an expert in electricity regulatory economics advising utilities and regulatory agencies, on energy pricing and tariff design, regulatory frameworks and the creation of utility regulators.

PETER ROBINSON
Director

Peter has over 30 years' experience as a consultant in energy, water and telecoms. Based in Zimbabwe for many years, Peter relocated to London in 2007 and maintains a strong focus on Africa. He has worked with senior officials in many countries and has advised several regional institutions on the delivery of urban and water services.

WILLIAM DERBYSHIRE
Director

William has 15 years' experience in consulting on utility regulation and energy markets. He has been a long-term advisor to the electricity regulatory agencies in Kosovo and Vietnam as they introduce new power markets. William is based in our Bangkok office.

NICK HARALAMBOPOULOS
Director

Nick is an economist with a comprehensive understanding of the utility sectors and has 20 years of experience. He has focused on the assessment of energy projects and markets, while continuing to work on market design, energy pricing and regulatory issues. Nick is heading our Athens office.

Case study 1: supporting the Government of Zimbabwe in water institutional reform

Title Establishment of water regulator and development of service agreement

Country Zimbabwe

Client World Bank and Government of Zimbabwe

Description of project

Following ECA's previous recommendation for the water sector institutional reform and inline with the Water Policy issued in 2013, the Government of Zimbabwe wants to establish a water sector regulatory authority. In addition, institutional arrangement within the sector needs to be clarify to strengthen monitoring of sector performance, as well as relationships between asset owners and service providers. ECA was engaged by the World Bank to continue to support the Government of Zimbabwe in implementing the institutional reform.

Services provided by ECA

Develop a business plan for the establishment of a water sector regulatory authority, which include identification and definition of regulatory functions to be undertaken by the new regulatory authority, how the authority should be governed to ensure decision making and financing autonomy, staffing requirements, and estimated initial budget and operational costs.

Review of different types of asset ownership and service provision relationships and analysis of what will work best for Zimbabwe. Development of service agreement template, which include a self-assessment tool to determine base line performance, and the key performance indicators and targets that will be monitored in the service agreement.

Case study 2: supporting the electricity utility in Cyprus on tariff structure and level

Title Electricity tariff study

Country Cyprus

Client Electricity Authority of Cyprus

Description of project

ECA was appointed by the Electricity Authority of Cyprus (EAC) to design new tariff structures and levels period covering the entire vertical chain of service provision (generation, transmission, system operation, distribution and supply). The Cyprus energy sector is undergoing significant change (e.g. expected arrival of natural gas, full liberalisation of the electricity market, greater penetration of renewable energy, etc.), which means that the Cyprus electricity market in future will be very different to that which exists now. The challenge therefore was to define tariffs that are consistent with feasible scenarios of the physical development of the electricity and gas sectors in the country.

Services provided by ECA

Analysis of wholesale market prices, design of transmission and distribution use-of-system charges, design of ancillary service charges, re-design of end user tariffs including time-of-use pricing, simplification of tariff categories, assessment of possible Public Service Obligations, revenue simulation to ensure proposed tariffs matched revenue requirements.

Case study 3: projecting financial revenues of UK-EU gas interconnectors

Title Market assessment for gas interconnectors

Country GB, Belgium, Netherlands

Client ACM, CREG, Ofgem

Description of project

Project to model the Dutch, Belgian and GB gas markets to assess the extent to which the gas interconnectors, IUK and BBL will have and be able to exercise market power when their current long-term contracts come to an end in 2018 and 2022 respectively. In addition to standard competition measures models are developed to assess market dominance as well as merit order within the markets to assess the extent that capacity withholding can affect price differences between the markets, which would increase the value of the interconnectors to their shipper clients.

Services provided by ECA

Developed a model based on a merit order concept to project congestion rents and quantify market power of the interconnectors. Conducted scenarios analysis and projected financial impacts for pipeline operators. Market description and market definition analysis (SSNIP testing). Market dominance testing (HHI, pivotal supplier analysis, withholding analysis). Recommendations on regulatory provisions to Belgian, Dutch and GB energy regulators for IUK and BBL interconnectors.

Case study 4: advising the Government of Kenya on minigrid regulatory frameworks

Title Regulatory frameworks for mini-grids

Country Kenya

Client Ministry of Energy and Petroleum

Description of project

ECA worked closely with the Ministry of Energy and Petroleum and other sector stakeholders to consolidate and develop a comprehensive policy and regulatory framework for mini-grid development in Kenya. This included analysis of business models, tariffs and financing (and the requirement for subsidies), technical guidelines, legal requirements and procurement. Key issues for analysis included the application of national tariffs (and implications for project financing) and the economic and technical procedures for grid connection as the national grid expands.

Services provided by ECA

Tasks included analysis of business models, tariffs and financing (and the requirement for subsidies), technical guidelines, legal requirements and procurement. Key issues for analysis included the application of national tariffs (and implications for project financing) and the economic and technical procedures for grid connection as the national grid expands.

Case study 5: developing restructuring options for Pakistan's gas sector

Title Gas sector restructuring

Country Pakistan

Client World Bank, Ministry of Petroleum and Natural Resources

Description of project

The objective of the project was to recommend on a suitable gas sector structure to ensure the financial viability of the sector, the introduction of higher cost LNG imports, the development of transmission system expansion and private sector participation. In a first step we identified the major challenges of the sector in light of depleting domestic production levels over the short to medium term. In a second step, we proposed different gas sector restructuring options by considering policy objectives, international best practice and quantitative economic analyses (economic and financial netbacks and subsidy saving calculations). Thirdly, we conducted a high level stakeholder consultation process to identify the most feasible option for Pakistan along the dimensions of pricing, market structure and design, market regulation, access to infrastructure, unbundling and privatisation. In a final step, we developed an implementation roadmap defining the reform steps needed to achieve the recommended outcome over the medium term.

Services provided by ECA

The main services provided by ECA team: gas market regulatory review, supply/demand projections, netback analyses, sector restructuring, qualitative analysis of different policy and reform options for the sector, development of implementation roadmap, pricing review, unbundling recommendations, institutional reviews and gas transmission planning recommendations.

Selection of recent projects

Electricity network pricing for Greece, *RAE*	Ireland forward electricity markets and liquidity, *CER*	Gas transmission tariffs review in FYR of Macedonia, *TE-TO Skopje*
Establishment of energy regulator, Zimbabwe, *World Bank*	Turkey CCGT regulatory and market due diligence, *confidential*	Expert witness for gas export potential in the Middle East, *confidential*
Albania gas to power development, *Government of Albania*	Electricity cost of service study in Iraq, *World Bank*	PPP toolkit for India, *World Bank*
Global water sector institutional diagnostic tool, *World Bank*	Ukraine gas sector restructuring, *Government of Ukraine*	Uganda water tariffs and affordability, *National Water & Sewerage Company*
Renewable energy strategy for Botswana, *Government of Botswana*	Indonesia cost of service and tariff study, *World Bank*	Electricity sector reform for Egypt, *Government of Egypt*
Papua New Guinea electricity grid expansion action plan	Serbia wind power PPAs, *EBRD*	Ghana gas Masterplan, *Government of Ghana*
Gas flaring regulatory framework for Egypt, *EBRD*	Resident advisors to Vietnam electricity regulator, *ERAV*	SAPP electrification plan update, *SAPP Secretariat*

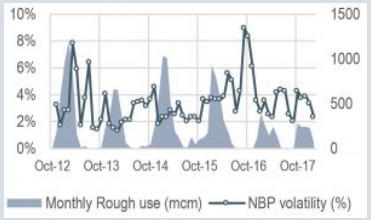
Selected ECA Viewpoints

Successful WSS programmes: it's not about the money

Standard economics begins with the assumption that we behave rationally and in our own interests. We seek to maximise utility, which is often equated with maximising monetary gain. Behavioural economists challenge this by identifying areas where observed behaviour does not correspond to the standard predictions. In this viewpoint, we look beyond the standard monetary incentives in the water sector and draw key lessons from behavioural economics, which policymakers should be aware of.

Electricity mini-grids: how should costs be regulated?

In a previous article, we discussed whether policies will allow cost-reflective tariffs for isolated and grid-connected electricity mini-grids in developing countries*. Less attention in policy-making circles has been placed on how 'reasonable' costs should be calculated. In this note, we outline a methodology for determining such 'reasonable' costs, and identify challenges for implementation



GB gas market neither shaken nor stirred by Rough closure

The closure of GB's largest gas storage facility (Rough) led to concerns among market observers and participants of supply shortages and increased GB gas price volatility. This viewpoint explores what sources replaced the supply gap left by Rough (and higher demand) and their impact on price volatility. We find that domestic production and increased EU imports – not LNG – filled the gap. While this does increase GB's price exposure to the EU market but not necessarily its price volatility – pending future EU-GB gas trade arrangements

More Viewpoints can be found at www.eca-uk.com/publications/

Selected clients

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