ECONOMY, ENERGY AND FAIR WORK COMMITTEE
PUBLICLY OWNED ENERGY COMPANY INQUIRY
SUBMISSION FROM CHRIS COOK

Background

I am an expert in geopolitical energy strategy and policy with 25 years’ experience of the legal design of institutions and instruments on all scales, from community (micro) level to global (macro) market level. My experience includes the design – as a Director of what is now the largest global energy exchange - of the UK natural gas Balancing Point futures contract. I subsequently designed and implemented the first shared global market transaction database – OilClear – which is now integral to both the dominant global energy exchanges.

I have participated as a UN expert in major international energy conferences and am currently advising two major energy producer nations in relation to energy strategy generally and energy financing & funding using new protocols and instruments (beyond Blockchains and Coins-as-proofs) of Energy Financial Technology (Fintech),

As a Senior Research Fellow of the Institute for Strategy, Resilience & Security of University College London, I have been conducting research into the institutional design and financial instruments necessary for the transition to a low carbon economy, based upon a review of international energy policies and legal designs, and a historical review of UK legal design of institutions and instruments generally.

Scottish Publicly Owned Energy Company (POEC)

- What are your general views on the idea of a Scottish publicly owned energy company (POEC)?

The concept of a POEC as a public energy market intermediary/middleman is fundamentally flawed not because of its ownership or governance but because the concept of intermediated commodity markets in energy services such as electricity, heat & power is fundamentally flawed.

Strategic Trends

By way of context, there are two strategic trends relating to energy intensity and capital intensity which are driving the evolution of markets and economies.

(a) Energy Intensity

The former Saudi oil minister Yamani observed that the Stone Age did not end because of lack of stones, and that the Oil Age will not end for lack of oil. Whereas 30 years ago one barrel of oil fuelled the production of over 35 barrels, now the 'easy' oil has been extracted, and a barrel of oil may now be needed to fuel the extraction of 5 barrels or even less.
So while energy intensity of oil & gas production has increased, the Energy Return on Energy Invested (EROEI) has declined to the extent that the oil price has reached a level at which it is increasingly unaffordable, affecting demand. Moreover, it is increasingly economic to substitute oil with renewable energy, and to reduce oil use through smart interventions in energy efficiency (the Fifth Fuel) through 'smart' delivery of energy as a service.

By way of historic example, in 1778 James Watt did not sell his pumps to Cornish tin mines as a commodity, but provided pumping as a service in return for a third of coal savings made at the retail price.

(b) Capital Intensity

The current energy market is a transactional commodity market where energy is produced, bought and sold to consumers by intermediary middlemen such as oil companies or the Big Six, with a view to investor profit. Finance capital typically takes the form of equity (shares in a joint stock company) or debt (bank credit based in turn on bank equity capital).

The advent of pervasive direct instant ‘Peer to Peer’ connectivity, and the rapid pace of development of new technologies, smart knowledge and data sharing (the ‘sharing economy’) and direct investment is driving a trend to ‘capital lite' services from capital intensive infrastructure, and high capital requirements for market and credit risk. In other words, smart intellectual capital is displacing physical and financial capital.

Finally, the advent of new Financial Technology (Fintech), combining collective machine protocols (Blockchains) with completely new financial instruments 'Coins' demonstrates that innovative and complementary forms of finance capital are in fact available beyond the conventional equity and debt.

In summary, the concept of the POEC as an institution should be reimagined to reflect the fundamental role of delivery of energy-as-a-service to the public through a new services market paradigm. The experience of Denmark since the 1973 Oil Shock points the way.

- What role should it fulfil and how?

No-one consumes raw energy in physical commodity form such as oil and gas. What we actually use is “Energy-as-a-Service”- dynamic energy delivered over time, such as heat/cooling, power, mobility, electromagnetic radiation & light.

Following the 1973 Oil Shock, when the oil price rose by 400% from $3 to $12 per barrel, Denmark (with an economy > 90% reliant on oil) faced an existential threat and implemented a new bipartisan energy strategy in order to achieve energy resilience, security and independence.

The organising principle of Denmark's resilience-focused energy strategy was that for any given use of energy as a service, the Danes minimised consumption of oil as a commodity.
Denmark therefore invested massively in renewable energy such as wind (creating a global leader, Vestas, founded on Scottish technology), in heat & power infrastructure (again building huge expertise and a technology base); a switch in mobility to cycling and efficient public transport; investment in buildings and so on. In other words the Danes put energy cost before financial cost.

The following image strikingly illustrates how this organising principle transformed Denmark’s energy infrastructure from a centralised National Grid, in 1990, to an emerging distributed Natural Grid in 2014.

What about the economic outcome? Surely this massive infrastructure investment – which broke all the conventional market rules – must have wrecked Denmark’s economy? In fact, while Denmark’s GDP has more than doubled since 1973, the Danes’ energy use declined and carbon fuel use declined significantly, which in turn (as an unintended consequence) serendipitously reduced Denmark’s CO2 emissions.

So Denmark demonstrated in practice that to apply a strategic organising principle of least resource cost leads not only towards national resilience, energy security & independence but also to a transition to a low carbon economy.

Denmark did not achieve this transformation top down. While Denmark’s energy utilities were publicly owned, Danish local government is not only more local than in Scotland but was also well resourced fiscally through land value taxation (but note this source has been diluted).

Denmark was therefore able to deploy public capital, directly and indirectly (eg through guarantees of bank loans to Coops) for local investment in local electricity, heat, power and transport infrastructure which would not have been financially viable for private utilities.
using debt and equity in the Nordic commodity market in energy emerged from 1995 onwards following the UK commodity market model.

Scotland has very different institutions to Denmark: Scottish councils are regional, not local; our energy utilities are in private not public hands; and in any case, energy policy is reserved to Westminster. So Scotland needs innovative instruments and networked & decentralised institutions and to mobilise resources and moreover, it must be possible to implement these bottom up with little or no change in the law.

- What are the key challenges that the POEC should address?

First and foremost is the challenge of financing development of new Scottish infrastructure and funding sustainable and adaptable future-proofed operation.

This in turn requires new funding instruments implementable at local level and scalable in operation. Our innovation here is the Energy Credit Obligation (ECO), which is simply a promise or credit instrument issued by energy suppliers and returnable in payment for energy supply.

Secondly, there will be resistance from incumbent energy and financial intermediaries. However, as referred to above the market is already evolving in response to trends, and both the Big Six and banks will evolve from capital intensive middlemen to ‘capital lite’ providers of smart energy and financial services.

- How might a Scottish energy supply company work best to support the growth of local and community projects, and fuel poverty reduction?

It is envisaged that the POEC will be a energy platform company comprising the sum of a network of Local Energy Companies (LEC). So the Linlithgow Energy Company will be a member of the West Lothian Energy Company, which in turn will be a member of the Scotland Energy Company.

LECs and hence regional and national companies will be multi-stakeholder Companies without limited liability, with the following membership classes: energy consumers/producers; energy investors; energy service providers; public interest custodians.

LECs will be designed to deliver investment in energy infrastructure at local level and to retain as much of the value of energy production and efficiency at local level as is possible and equitable. Fuel poverty will be addressed not by delivering cheaper energy (which leads to wasteful consumption) but through energy dividends of ECO credits which give the fuel poor the means to pay.

- How can the POEC be best designed to align with wider Scottish energy policy objectives, and to avoid potential policy conflicts?

The aim of each LEC will be energy independence (and hence resilience) through the application of the least resource cost organising principle to minimise resource use. That being so, the aim of the POEC will be the same and if accurately implemented the outcome could be expected to be the evolution of a Danish-style distributed Scottish Natural Grid
• **Should a new Scottish POEC be more than solely a licensed energy supply company? Should it have a direct role in energy generation?**

Investment, supply and generation will be integral to the POEC as an institution.

• **How might the POEC be designed to promote objectives and functions beyond the retail of gas and electricity (e.g. supporting investment and innovation in new technologies and infrastructure)? What benefits are there to having wider objectives?**

The POEC as an institution is not an organisation, but is better seen as a framework agreement for self organisation to a common purpose. Research and development of new technologies and infrastructure will require new institutions linking the academic/public and commercial sectors which share the same aim of resource resilience and organising principles.

• **What governance arrangements should a Scottish POEC have? Who should it be accountable to e.g. Parliament?**

The multi-stakeholder legal design for LECs and hence POEC is termed **Nondominium.** No stakeholder group has the right to impose decisions on other stakeholder groups, who have certain veto powers of governance, while delegating service provision within agreed strategic parameters. The ultimate power of veto will be exercised through local democratic representatives acting as custodians of the public interest. Accountability to Parliament will be through delegation from local to regional and national level.

• **Should legislation be required to underpin the creation of a POEC?**

Proof of Concept LEC’s are implementable with no change in the law, and if these are effective, may be straightforwardly networked regionally & nationally to create a POEC. The energy services institutions and instruments described above of networked LECs with Energy Credit Obligation (ECO) funding will deliver – via a suitable online accounting and energy market clearing platform – the complementary financing and funding which comprise a new generation of energy ‘financial technology’ – **Energy Fintech.**