IMPRESSIONS FROM THE CONFERENCE FLOOR

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The 10th annual Cleanpower Smart Grids Conference 1-2 July 2019, held at Robinson College, Cambridge, in its newest (Oct 2015) and most comfortable self-contained executive conference building, heard presentations by innovators, energy company leaders, policy makers, analysts and regulators. If there were any academics, they were industrial ones aka entrepreneurs or market analysts.

Variety of sector (Modelling and Forecasting, IP Law, Smart Metering, Cybersecurity, Infrastructure, Regulation) was matched by variety of scale (from the nanoscale of droplet deposition in jet-printing for battery solutions to macro-economics and global power shifts due to a new 'gold rush' on Lithium and Cobalt).

From all this variety, a number of recurring themes emerged over the course of the two days.

The following notes from the conference floor are intended to serve as a reminder of this cross-sector connectivity and to invite you to refresh your memory with the individual presentations archived on the CIR Strategy website.

CONSTANT FLUX IS THE NEW STEADY

This year 50% of the UK energy supply is likely to come from low-carbon generation, with all the supply intermittency and grid adaptation challenges this entails. Beyond the transformation already effected by wind and solar, there is hydrogen, nuclear fission, fusion…where will they come in, if they go anywhere? The future of energy is bound to be distributed, fragmented and volatile.

Many presentations explored the agile behaviour required of all market participants from now on, be it in technological solutions (National Grid, CyanConnode, Anesco) commercial pathways (NERA) and regulatory frameworks (Ofgem).

THE IMPORTANCE OF PLANNING AHEAD

How can the challenge of forecasting and planning in this new environment be met? The conference heard several presentations on the step change in modelling capability presented by the advent of ML and AI (IBM, Darktrace, T-DAB, PolyChord) that enables perpetual running of 'What if' scenarios with real-time diagnostic and remedial impact.

If you didn't plan ahead, others will have: A contribution by Cambridge University on the geopolitics of lithium revealed the central position China has acquired in the supply chain and the threat of 'new energy dependencies' other than for example, that of Germany from Russian gas or the world from OPEC oil.

The commercial value of strategically-planned IP exploitation for multiple applications was illustrated by Marks & Clerk LLP.

THE VALUE OF SELF-KNOWLEDGE

Knowing your starting position well makes for a more successful journey be it in asset mapping by local authorities (Energy Systems Catapult) or in high data transmission reliability of self-healing meshes (CyanConnode plc).

Self-knowledge becomes stark operational necessity in cybersecurity, as the conference heard from Darktrace and QinetiQ: without perpetual AI re-evaluation of an organisation's digital 'self', no intrusion can be flagged as anomalous behaviour; without an understanding of human nature, well-meant interventions to modify personnel behaviour can have negative effects.

FUNDAMENTAL SOLUTIONS

The world is not running out of fundamental challenges to tackle just yet: Three presentations by materials scientists (Cambridge University, CamJet, Aurelius Environmental) gave insight into ongoing research to understand properties of matter. In turn, this can be translated into real-world applications: transforming crude industrial legacy technology in battery production into ultra-precise manufacturing and recycling lead into a nano-structured state with superior electrochemical properties.

Innovate UK described the portfolio of current funding initiatives designed to elicit innovative technologies and/ or gain fundamental knowledge by proving/ disproving technological concepts.

ISLANDS, ARCHIPELAGOES

Many contributors described the future energy landscape, be it national or global, in terms of fragmenting geography, as islands of decentralised operations, data silos, disconnected policies. Paradoxically, mutual impact between these islands is increasing at the same time: on a local or on a country-to-country basis (the latter illustrated by ABB), resulting in fluid, clustered groupings.

Several contributions explored the issue of mutual intelligibility, good systems architecture for grid edge intelligence learning enabled by the 2nd and 3rd wave of smart meter technology and the potential for common learning with a view to achieving a state of comprehensive national 'Grid share' (Landis+Gyr; Energy Systems Catapult, Moixa).

LOST IN TRANSMISSION?

For a low-carbon future to be realised a collective societal effort will be required. The question of how consumers can be persuaded to adopt energy efficiency more

fully was touched upon by several speakers (QinetiQ, Energy Systems Catapult, Dept of BEIS).

Dinner on Day 1 afforded an opportunity to explore the gap between technical feasibility and likely society-wide implementation further. An informal vote on whether 'Net zero carbon by 2050' resulted in an overwhelming majority for 'yes, we can' and a sizeable one for 'but we won't.'

'How to convince Gavin to have a smart meter fitted' will have to be answered by the 2020 conference… perhaps translating 'decarbonisation' into vocabulary more meaningful to citizens at large?

CONTROVERSIES THAT WEREN'T

Equally noteworthy were areas of implied consensus, implied by the absence of debate:

EVs are on their way - most of the contributions over the two conference days assumed large-scale and lasting impact of EVs on national energy demand and national infrastructure sooner rather than later. The point was made by Faraday that Total Cost of Ownership parity coming in 2020 is one thing, but Capital Cost of vehicle parity coming in 2024 was quite another (for accelerating adoption).

Data privacy - a utilitarian view prevailed throughout; access to useful information for the common good is more important than narrowly defined data ownership. GDPR was felt to promote rather than hinder data availability.

…and last and also least…leaving the European Union - this came up but twice, as an interesting trial of 'sorting one's own problems' with grid stability (where France or Germany can shift a load to a neighbour if necessary, the UK may have to contain surges in future unless pipes exempt) and a role model for Japan. The chair opined in closing remarks that absence of such debate had been refreshing and the time had been well spent on things on which the conference was expert and could do something very useful about, i.e. enabling clean energy and growth.

Overall, the common mood was one of quiet confidence in the ability of the UK's Cleanpower and Smart Grid technology base to meet future challenges successfully.

On a personal note, here are a few things I have learnt over the last 2 days

- It turns out there is too much sun in Yorkshire.
- Bolivia is exceptional among South American countries in deferring commodity extraction until it gets its own battery technology industry started.
- In some parts of the world, a 35.000V wand is standard domestic meter testing equipment.
- The importance of doing your sums properly: the carbon footprint of 'clean' energy storage devices may not be as small as one would have assumed.
- Node mesh maps make good modern art.