

## ***Capenhurst 2024: end of one era, beginning of another***

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### **Introduction**

Autumn 2024 saw significant changes for two companies based at the Capenhurst Technology Park, U.K: C-Tech Innovation went into liquidation while EA Technology announced a partnership with the Swedish Company Summa Equity. So ended on the one hand almost 60 years of pioneering R&D in industrial electro-utilisation while on the other hand a new chapter began in the expansion of EA Technology as a solutions provider for monitoring and management of electricity grids and assets.

This article sets the scene and outlines the key factors that led to these developments.

### **The nationalised UK Electricity Supply industry (ESI)**

In 1958 the newly nationalised UK electricity industry was re-organised. Electricity was produced by the Central Electricity Generating Board (CEGB) and transmitted via the high voltage National Grid to regional electricity boards (Area Boards). These companies sold and distributed electricity (at lower voltage) to industrial, commercial and domestic customers within their geographical area.

A central body, the Electricity Council (EC), representing the CEGB and Area boards was responsible for policy making, links to Government, financing, industrial relations and general marketing and communications.

The CEGB invested significantly into R&D for generation and high voltage transmission. In 1965, under the auspices of the Electricity Council, a new facility, The Electricity Council Research Centre (ECRC) at Capenhurst, Cheshire was set up to provide complementary R&D for electricity distribution within Area Boards and the utilisation of electricity, principally industrial. The aim of the latter was to provide opportunities for Area Boards to sell electricity through the introduction of clean, efficient electric technologies, often challenging processes using gas heating. Funding of ECRC was provided by a levy imposed on the Area Boards.

ECRC was the forerunner of equivalent centres in Europe, for example, Laborelec in Belgium, KEMA in the Netherlands and Les Renardieres in France as well as the Electricity Power Research Institute (EPRI) in the USA.

The founding Managing Director of ECRC, Dr Trevor Churchman, had a clear vision for the future: an all-electric society. Consequently the expansion of utilisation R&D was readily embraced. Distribution research remained equally important, dealing for example with the critical issues of an ageing transmission network.

In parallel with the creation of ECRC, the Electricity Council expanded its marketing and educational activities for electro heating, supporting the setting up of the British National Committee for Electroheat (BNCE).

### **Life at ECRC**

A flavour of the role of a research officer at ECRC may be seen from the experience of past President of AMPERE, Ricky Metaxas who worked in the electro-physics group before moving to the Engineering Labs at Cambridge University in 1982: "I was employed as a Research Officer at ECRC and my first assignment was to devise a method for measuring the dielectric properties of paper and board as a back-up to the engineers, such as Peter Jones, within the electro-physics group who were at the time designing equipment for industrial pilot scale trials. During my time at ECRC I fostered many relationships with industrialists, the most notable being Roger Meredith who headed Magnetronics Ltd and with whom a joint book Industrial Microwave Heating resulted, dubbed. "the Bible" for technologists who are working with microwaves.

It is important to stress that the 1970's was the decade which highlighted the problems associated with diminishing fossil fuels and the need to look for alternative techniques for carrying on out many processes in industry. The volatile nature of oil costs coupled with gas unavailability in some parts of the

world had compelled many industrialists to consider novel electrical techniques.

In the U.K. a large number of the enquiries about the use of electricity in manufacturing and other industries emanated from Area Board engineers who would visit their industrial colleagues and bring back to base requests for trials and purchase of equipment. The BNCE, based at the EC headquarters, was cooperating with the Area Boards in mounting short courses and seminars and liaising with ECRC, resulting in my colleagues Peter Jones, David Hodgett, Bob Perkin and myself troubleshooting in industrial premises.

Manufacturers of equipment in the UK such as APV-Magnetronics (Roger Meredith eventually selling to APV), Radyne, ROTAX, Strayfield, Petrie, all had strong connections with BNCE and the Area Boards and in monetary terms the Electricity Council had a key role in funding the BNCE and in encouraging such collaborative work. It saw it as its mission to introduce clean and efficient electrical systems in industry and commerce in order to eradicate the inefficient use of conventional fuels. The heyday of such collaborative work in the UK was throughout the 80's. This came to a thundering halt with the privatisation of the Electricity Supply Industry in the early 1990's".

### **1990's Privatisation of the ESI - consequences for the promotion of electro- technologies**

The reorganisation and revised business strategies following privatisation meant, essentially, that the Area Boards no longer had a direct interest in promoting electro technologies. The Area Boards at the time had development centres all equipped with the most modern electro-heat equipment and all these without exception were forced to close signalling in effect the end of the long collaboration between BNCE and the Area Boards (the plc's as they are all called following privatisation).

After organising the UIE (Union Internationale de l'électricité) Congress in 1996 in the UK, BNCE had scaled down its operations and having failed to meet the fee for belonging to UIE it subsequently ceased to exist. It is fair to say that with the privatisation of the ESI, the back-up that BNCE and the Area Boards received, all but evaporated and it was left largely to small university groups to take

up the challenge of convincing industrialists to switch to electricity for their multifarious processes. This is evidenced by the groups that are still active in the field at the universities of Aberdeen, Cardiff, Edinburgh, Hull, Loughborough, Nottingham collaborating with industrial colleagues such as John Bows, formerly at Unilever Research and now at Pepsico, Jennifer Marshall-Jenkinson at the Microwave Technology Association, and colleagues at the EMMA Group at the National Physical Laboratory.

### **1990's Privatisation of the ESI - changes at ECRC Capenhurst**

In anticipation of privatisation changes had been made, one of which was the name of the company, now EA Technology. While the Area Boards no longer had any interest in utilisation R&D they maintained their support for distribution work.

However, the funding by levy was replaced by funding on a project specific basis. Alternative funding sources were sought, for example, through contract R&D with industry. After several years, however, the position of the utilisation work became untenable. In 2000 this resulted in the closure of the "industrial" division and the hiving off of selected technologies into a private company, C-Tech Innovation, owned by the Directors and staff, former employees of EA Technology. Eventually ownership of EA Technology was likewise transferred to its Directors and staff.

### **1990's Privatisation of the ESI - creation of C-Tech Innovation (C-Tech)**

After an initial difficult couple of years, the Management team led by Ged Barlow created a successful, profitable, stand-alone contract R&D business offering experimental and development facilities, and technical expertise primarily in electro-heat, electro-chemistry and environmental issues.

Over the years many large industrial heating projects were undertaken resulting in significant achievements in plasma, ohmic, RF and microwave processing. Due to confidentiality these remain largely unsung. Participation in EU Framework research programmes, however, introduced C-Tech's capabilities to a wide scientific and

engineering community. Led by the Directors Mike Harrison and Ian Dalrymple, C-Tech was highly successful in gaining funding to lead and participate in a wide range of collaborative projects. For the FP7 programme, for example, the company was judged the highest ranked UK SME participant and in the top 25 in Europe.

Later, in addition to the contract R&D, a range of products were developed: C-flow, C-joule and C-wave for electrochemistry, ohmic heating and microwave chemistry applications respectively.

In 2018 with the retirement of the last founding Director there was a Management buy-out followed by a rebranding of the business. The year 2020 brought Brexit. Sadly in September 2024 C-Tech filed for liquidation.

### 1900's Privatisation of the ESI - expansion of EA Technology

In 2016, at the 50 year celebrations commemorating the creation of ECRC, the CEO of EA Technology Robert Davis commented "The evolution from a publicly funded research institute, to a commercially focussed technology solutions business, required real change to the culture, leadership and skill sets within the company. The growth we experienced was significantly due to developing our international footprint". Prior to recent developments, after privatisation of the ESI the distribution business had been patiently grown to the point where it had reached £48 million in annual revenue, a significant increase from pre-privatisation days, and had some 300 employees. A sizeable portfolio of incoming projects and consultancy had been built up.

EA Technology has become embedded in the operations and managing of electricity grids and assets. The company's industry-leading product suite of smart grid hardware, software and services today serves a global customer base across five regional offices, with a mission to promote the development of decarbonised, resilient, accessible and low-cost energy networks

The culmination of all these efforts was the announcement in October 2024 by the Swedish firm Summa Equity, based in Stockholm, of a huge investment and controlling stake in EA Technology.

CEO Robert Davis welcoming the news said: "Our partnership with Summa will help us scale and

enhance our offerings, ensuring we remain at the forefront of smart grid technologies. This investment aligns perfectly with our mission to support the energy transition and drive innovation in the sector. We are well-positioned in several markets through our leading product portfolio, industrial know-how and unique cross-disciplinary competence".

Gisle Glück Evensen, Partner at Summa, said: "Transitioning from a fossil fuel-based system to renewables presents a significant challenge to today's electricity grids, driven by rapidly increasing electricity demand, intermittency and multi-directional flows. Solving these challenges is essential to achieve energy decarbonisation and presents a multi-generational investment opportunity to upgrade and modernise grid infrastructure".

### Concluding remarks

The decision almost sixty years ago to create ECRC and associated organisations to develop and promote industrial electro technologies was farsighted. The founding Director, the late Dr Trevor Churchman, would likely be impatient with the pace at which we are moving towards the "all electric society". Doubtless, he would view the loss of C-Tech Innovation with much regret but equally would feel deep satisfaction at the way EA Technology has launched out into the world to promote the effective and efficient management of electricity distribution.

### About the authors



**Ricky Metaxas** is past President of AMPERE and a Life Fellow at St John's College, University of Cambridge, UK.



**Bob Perkin** studied physics at London University and obtained a PhD in Gas Discharge Physics. He joined the electro physics group at ECRC, Capenhurst in 1975, working on RF and Microwave applications. With the restructuring of ECRC he

joined the commercial team within EA Technology responsible for seeking external funding from industry, the UK Government and EU. After the closure of the industrial division of EA Technology

he moved to Petrie Technologies, later returning to Capenhurst to work part time at C-Tech Innovation in a technical role, working principally on RF and microwave processing until his retirement in 2015.

## ***UIE congress 2024 - “Electrification of industrial thermal & manufacturing processes”***

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Following a long tradition of UIE (International Union for Electricity applications), the 20<sup>th</sup> UIE Congress was organized in Nice (France) from 8 to 11 October 2024 by the Centre for Material Forming of the Ecole des Mines de Paris.

UIE congresses started more than 80 years ago in the Netherlands, and after the recent congresses taking place in Hannover (Germany) 2017 and Plsen (Czech Republic) 2021, in this 20<sup>th</sup> edition the focus was on the electrification of industrial thermal and manufacturing processes.

The audience was constituted by 60 participants (**Figure 1**), half coming from academe and half from industry. Participants were from 14 countries with a strong representation of France, Germany and Italy. 45 presentations were given, including 3 keynotes at the beginning of each day of the congress.



Fig. 1: UIE congress 2024 - ~60 participants.

Sessions discussed decarbonization of thermal and manufacturing processes by electrification, including induction heating, plasma heating, and dielectric heating (**Figure 2**).



Fig. 2: UIE congress 2024 – Session on decarbonization of thermal & manufacturing processes by electrification.

Sessions on numerical modeling showed the way to further optimization of electromagnetic processes. Also the quite new topic of machine learning was presented by speakers who became already real experts in this new field of study.

Besides keynotes and ordinary presentations, two round tables were organized bringing together academe and industry. These round tables triggered vivid interactions with the audience on the topics of decarbonization (**Figure 3**) and the usefulness of artificial intelligence in the design of industrial processes.