



IES

News Bulletin

February 2025

The Institution of Engineers in Scotland A Multi-disciplinary Engineering Institution



Welcome to the second Bulletin of my Presidency.

Since the last bulletin we have had some great lectures, industrial visits, and cuppa and chat meetings.

Planning for our next programme

We are putting the final touches to our 25/26 lecture programme and I very much look forward to sharing the details with you all soon. I hope you will join us in person at these lectures and enjoy the company of fellow engineers and other interested parties. The new lecture venue of the Royal Faculty of Procurators has proven to be very successful and comfortable for us and I would like to thank the staff there for their help in making this work so well.

Membership drive

We are pleased to welcome all new members who have joined us over the last year!

This last year has been one of our most successful years for recruitment – nearly 50 new members! We do hope that you have been able to take part in some of our activities and enjoyed our publications

Groups IO

Momentum has fallen away a little here, but we will try to 'seed' some dialogues with topical subjects – feel free to start a dialogue on something close to your heart!

<https://groups.io/g/IESConversations>

Visits

Many thanks to Howden's, Whitelee Wind Farm and Star Refrigeration for hosting recent industrial visits by members and friends of the Institution. We are planning more members' visits in the coming months.

Suggestions made so far, include

- Recycling plant – Twechar
- BAE Systems – new construction hall Govan
- BAE Systems – HMS Glasgow, Scotstoun
- National Manufacturing Institute Scotland (NMIS) /CMEC – Inchinnan
- Vertical Distillery – Leith, Edinburgh
- Evolution Fasteners
- Denny Tank and Maritime Museum -Dumbarton
- Mini Submarine – Helensburgh
- New Footbridge/Swing bridge over the Clyde

It would be useful to hear your thoughts on these suggestions and to hear of any visits that you would like to add to the list. Please send any thoughts suggestions to secretary@engineers.scot

Cuppa & Chat

The **Cuppa and Chat** sessions will continue to give members a chance to generally discuss topic and content of the previous lecture and any other subject that may come up. Please join these sessions if you have anything to contribute or would like to hear other people's opinions. Details of these and their zoom links can be found opposite....



All meetings start at 5.30pm GMT

Date & StartingTopic

Zoom details

Feb 18, 2025

How covid has affected our buildings

Join Zoom Meeting <https://us06web.zoom.us/j/83291828059?pwd=BxYIPLtSv2KLOWaRcbMQt5VakMCXKo.1>

Meeting ID: 832 9182 8059
Passcode: 618180

Mar 18, 2025

Satellite communications

Join Zoom Meeting <https://us06web.zoom.us/j/84119891009?pwd=CkQtcGa6Ag1HGnvHrOOfRSc3KhhmT.1>

Meeting ID: 841 1989 1009
Passcode: 826393

IES Visit To West Dumbarton Energy Centre



We had an excellent visit to the hugely impressive heat pump installation at the West Dumbartonshire Energy Centre, Queen's Quay, Clydebank. The heat pump installation itself was built by Star Refrigeration in collaboration with Vital Energi. Even the building that houses the hardware is of a handsome design. The system began producing heat in 2020.

Dave Pearson, Group Sustainable Energy Director of Star (he's also a Royal Academy of Engineering Visiting Professor at Napier no less), explained the facility and showed us around.

300 litres/second of salty Clyde Estuary water are pumped into the system. 2 x 800kW electric motors drive the compressors through variable frequency drives. The refrigerant is ammonia which is raised to 100 degrees Centigrade. The Scottish Environmental Protection Agency (SEPA) require that the water that exits the system back into the Clyde should not have been cooled by more than 3 degrees and require that marine life is prevented from entering with a 1500micron primary filter. Molluscs are prevented from entering with a 20micron filter.

The ammonia requires an emergency pressure release mechanism and this is provided in the form of a relief valve that would release to a 30 metres high tower that doubles as a chimney for gas

boilers which are utilised as backup and for short term peak demand.

The chiller is fabricated with titanium tubes to remove any problems with corrosion due to the salt water.

The heat pump supplies a district heating scheme with hot water to a mix of local buildings – housing, medical centre, swimming pool, sports hall, Town Hall and potentially West of Scotland College. At the time of our visit water was being heated to 71 degrees Centigrade and returned at 60°C. The price of gas, approximately 6 pence per kWh is much lower than the price of electricity which the Energy Centre is buying at 25 pence per kWh, although the heat pumps create 3 units of heat per 1 unit of electricity. On the day we visited the South of Scotland electricity grid was 75% renewable in origin and approx. 22gCO₂/kWh. The resultant carbon footprint of the heat produced was therefore approx. 7gCO₂/kWh compared with burning gas at approx. 225gCO₂/kWh a staggering 97% reduction.

Dave (who would have made an excellent town crier in an earlier century) explained, over the noise of the machinery, the difference between these two costs is known as the Spark Ratio or Ratio. In the UK it is between 4:1 and 5:1. In Sweden it is 1:1. The UK has almost the most expensive electricity out of 27 EU countries and

almost the cheapest gas. It is no wonder that householders are not rushing to buy heat pumps. So, the independent Clyde College – just 50 metres from the heat pump – prefers to go on using its gas boilers rather take water at 71K from a low carbon/low NO_x source!

All is not lost though as the wind produced electricity at Whitelees windfarm is being sold to the grid at approx. 7p/kWh. A simple shift in policy would allow this to be bought in periods of sufficient supply at a price closer to 7p/kWh – a mechanism similar to the Energy Intensive Industries format enjoyed by glass and steel producers. Utilising the massive 130m³ hot water tank allows the heat pumps to be switched off if other demands are more deserving (e.g. if there is excessive demand around tea time for electricity elsewhere) and over 2.3MWh still fed to the network. These tanks are a fraction of the cost of electric batteries.

Dave also told us they were developing a floating heat pump in partnership with Malin (a Glasgow fabrication/engineering company). The barge could be towed to a city centre location without stealing precious real estate.



Artists impression of a heat pump barge moored outside the old IESIS office in the Clydeport Building!

PS. Within 24 hours of our visit there was an announcement that there will be a levy on gas prices in order to fund the introduction of hydrogen. This would be a difficult step to sell politically, but might level the playing field a little for heat pumps. <https://www.hydrogeninsight.com/production/uk-draws-up-1-5bn-plan-to-fund-green-hydrogen-production-by-levying-gas-companies/2-1-1765756>

This shows that policy changes if there is a loud enough voice.

Somehow or other we need to see more Queens Quays. **This is the first but until now the last one to be installed in Scotland.**

Upcoming lectures

Book Review – Graeme Fletcher *Blowing Hot & Cold* by Ian Johnston

Tuesday 11th February 2025 – Chris Iddon
Has Covid made our buildings less healthy? – limitations of building ventilation as a preventative measure

What is the legacy of preventative measures introduced during Covid? This lecture will look at the longterm effects particularly with more hybrid working and lower occupancy rates.

Tuesday 11th March 2025 – Dr Carol Marsh
The future of satellite communication

This lecture will explain what an Electronically Scanned Phased Array Antenna Gateway is, introduce us to Celestia-UK and explain the Gateway terminology, why they are important for Scotland.

Just announced!

The AGM will be held on 22nd April 6.00pm, in person and online.

Our lecture for 22nd, 6.30pm will be given by Jemma Quin full details:



Temporary Works

Its not about what you build, but how you build it!

This lecture will introduce you to the wonderful world of Temporary Works – the engineering of how things get built on site. You will be taken on a journey describing Temporary Works through the last many centuries. A journey from the Bragg Report all the way to the present day with the five steps to control Temporary Works on site

You will learn how to demolish a bridge and rebuild it over a weekend, while maintaining power connections and access over a railway line.

Jemma Quin is an award winning Chartered Civil Engineer, Public Speaker, STEM Ambassador and Author of "The Little Civil Engineer and Friends" book series. She has over 17 years' experience in Infrastructure such as Railways, Bridges, Water, Electrical Substations and Construction. She works for a principal contractor and volunteers with the Temporary Works forum to create industry guidance on Temporary Works (anything used to support structures, people, plant, the ground or test things onsite).



"Warm words for a cool invention"

After writing a number of books concerned with the shipbuilding industry on Clydeside, the author lamented the fact that virtually nothing appeared to have survived to put on record the achievements of the well-known engineering company, Thermotank Ltd.

'I had a personal connection with the company, as my father had worked there, and I recalled the name Thermotank being mentioned many times when I was a child. However, at this stage in the 21st century, it seemed that the Thermotank Company had simply disappeared without trace.'

He had encountered a common phenomenon in maritime, where mergers and acquisitions often lead to the extinguishing of past company names, but he was not going to let this put him off discovering more. It turned out that Thermotank Ltd was a particularly difficult organisation to research, because its successor companies had not maintained its archives. Yet, as Johnston embarked on his mission of discovery, he did eventually find libraries and former employees who had kept information.

So, what exactly was Thermotank? As Johnston finds out, it was nothing less than the first air conditioning system that could deliver both cooling and heating onboard ships. Invented by marine

engineer Alexander Stewart around the turn of the 20th century and developed by the company he founded with his two brothers, the device was adopted by major shipping companies such as Cunard and White Star and was later used in New York skyscrapers.

'In very simple terms,' Johnston explains, 'the Thermotank unit comprised a chamber containing numerous tubes which could either be filled with steam, cold water or brine to heat or cool the air circulating around the tubes in the chamber.'

'Air from the atmosphere was drawn into the chamber and thus treated, was then forced into a network of trunks (ducting), using electric fans which delivered the air to whatever compartments were to be heated or cooled.'

If you are thinking that this sounds like a story for marine engineering nerds, then you'd be right, and there's nothing wrong with that. It's fascinating to read about a device and a company that were nearly lost to history, and the author makes a good job of bringing the past to life through potted biographies of key figures and the memories of Thermotank employees.

Illustrations are used very effectively, including a photograph in which Thermotank devices can be spotted next to the funnels of the Lusitania. There are also diagrams showing how the system was installed, and even reproductions of old brochures which a former employee saved from a skip.

Embrace your inner nerd and pick up a copy!

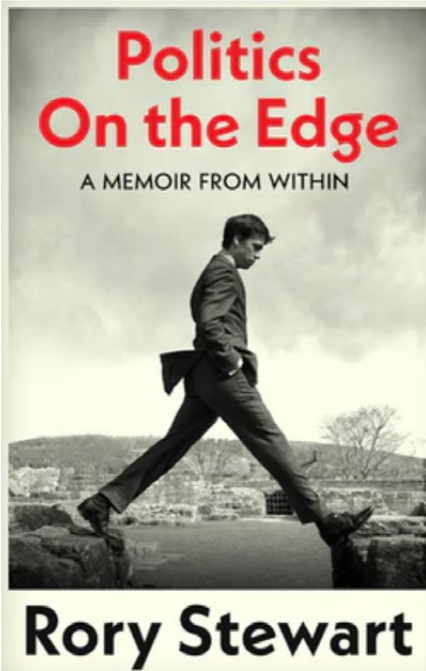
Blowing Hot and Cold: Thermotank and the story of air conditioning at sea

By Ian Johnston
Seaforth Publishing, £19.99
ISBN: 978 10361 07697



IES

Book Review – Angus Pinkerton *Politics on the Edge* by Rory Stewart



Members of the IES have over a number of years expressed concern about ill-thought-through decisions of politicians and governments, and wondering how some traction might be gained for a more critical, systems-thinking, and engineering approach to technology related areas of government policy. This very well written, and award winning, memoir goes some way to explain why, in the current governmental situation the UK finds itself, this isn't likely to happen – but may also provide some clues on how influence could be made more effective.

Over the course of the decade he describes in this book, Rory Stewart went from being a political outsider to standing for prime minister – before being sacked from a Conservative Party that he could barely recognise. With an opportunity that arose due to the fallout and resignations that were the result of the MPs expenses scandal, he unexpectedly won a first attempt nomination (and then election in 2010) as Conservative MP for Penrith and the Border. He describes discovering just how little impact a new MP has in Westminster, but he did unusually manage to persuade other MPs across all parties to vote him onto the Foreign Affairs Select Committee, and subsequently as Chair of the Defence

Select Committee in 2014 (the youngest MP ever so appointed).

Born in Hong Kong, the son of Scottish parents, where his father had spent some of his career as a colonial official and diplomat. Stewart had a peripatetic childhood in London, Malaysia and Hong Kong, before school in Oxford and Eton. During his gap year he served as a second lieutenant in the Black Watch, before studying (the apparently obligatory) Philosophy, Politics and Economics at Balliol College, Oxford. He was clearly well connected, as well as extremely clever, and acted a summer private tutor to both Princes William and Harry.

He is a very good writer, and has published two previous books, the first covering his time walking across much of Iran, Pakistan and the Indian and Nepali Himalayas, concluding with a 26-day solo walk across Afghanistan ("The Places Between"). The second book describing his time as (effectively) the governor of two provinces in southern Iraq, following the Iraq invasion ("Occupational Hazards: My Time Governing in Iraq").

In "Politics on the Edge" he describes a period of UK political turmoil, which included the Scottish Independence referendum (he was an active campaigner against) and the Brexit vote (where he strongly supported remain, although recognising that the result meant that a fundamental change in relationship with the European Union would be necessary). The Conservative party also went through an unusual number of Prime Ministers during that decade. He first became a junior minister in David Cameron's government, in DEFRA, with responsibility for the natural environment including flood response. In this role, as well as being the figurehead "Flood Minister" during the catastrophic flooding of 2015, he managed to steer legislation through which implemented a plastic bag levy in England and Wales (following its introduction the previous year in Scotland). Theresa May then appointed him as Minister of State for Africa (though all of his extensive foreign experience and considerable language skills were centred in the Middle East) and then, after a year, moved him on to become Minister of State for Prisons.

During his junior ministerial posts, he worked for both Liz Truss and Boris Johnson.

He reached what transpired to be the height of his political career when Theresa May appointed him to the Cabinet post of Secretary of State for International Development (though on the day of his appointment he thought that he was going to be given the job of Defence Secretary, and while waiting to be ushered into the Cabinet room in Number 10, he was rehearsing his acceptance of that role). Changes happen so quickly that, earlier that day, in his Prison minister role, he had been fitted with an experimental ankle tag, planned to be used for prisoners on remand or probation, expecting to see the results of the tracking on his return to his constituency in Carlisle. Instead, on leaving Number 10, he was driven directly to his new job at DfID, where no-one had the tools or technology to remove the tag.

He describes in detail the difficulties he found in achieving what he considered to be sensible changes, thwarted by both politicians and the civil service. He is particularly scathing of the role of the Whips in parliament, and the very uneven skills and experience that individual politicians brought to their ministerial roles. For those of us familiar with "Yes, Minister!", the behaviour of some Civil Servants would not come as a surprise.

However, despite falling at the final hurdle and being swept away by the Boris Johnson juggernaut that was propelled by the phrase, "Get Brexit done" (both within the Conservative party and then across much of the UK in the subsequent general election) he did manage some achievements in his time in Westminster. How his understanding of the political system evolved, and the ways he adapted his tactics to achieve some changes are educational.

Since 2022 he and Alistair Campbell (yes, the one who was Tony Blair's Director of Communications and Strategy) have hosted one of the best and most listened to podcasts in the UK, called, "The Rest is Politics." I commend both the book and podcast to those interested in how our government system actually works.