



ETP Submission to Call for Evidence into Research Pooling

The following response material has been focused on direct ETP experience of Pool strategic positioning, growth, contributions and collaborations:

ETP (Energy Technology Partnership)

- The ETP is an autonomous alliance of 13 independent Scottish HEIs providing world-class capability and resources in energy Research & Innovation, supported and co-funded by the Scottish Funding Council.
- ETP's vision is to build on the existing areas of demonstrable excellence and established academic, industrial and public sector collaborations, while exploring new national and global opportunities in the aspiration to evolve a lower-carbon society, to ensure that Scotland remains, into the future, a recognised world-leading source for energy related talent, Research & Innovation, and its commercialisation.
- It creates added value for the Scottish economy by acting as a proactive facilitator for partnership between academia and industry, external organisations and government, promoting and disseminating ETP's mission to translate excellent research into economic and societal impact – as evidenced in the ETP Knowledge Exchange Network, which an independent Scottish Enterprise review gave a GVA multiplier ratio of 4.3. Through the highly successful Energy Industry Doctorate Programme, ETP supports the energy sector with the skills it needs by providing research capacity and new doctoral graduates to maximise industrial growth and innovation opportunities.
- ETP's genesis was different to the other pools. Born out of a pan-Scotland proposal into UKG's DECC, ETP started as an energy technology organisation based around multi-disciplinary, interdisciplinary collaborations among leading Scottish Universities. As part of its strategy, it has grown to additionally encompass the other Physical, Natural and Social Sciences, as it responds to the developing need for '*whole systems research*' to address climate change challenges and ambitions.
- Initially, was not part of the SFC Pooling Programme. ETP was funded solely by its partner HEIs, and by the programmes it managed. In 2014 it was asked to submit a proposal into the SFC Pooling programme, and in April 2015 ETP was formally recognised as part of the programme when SFC awarded it 5 years of core funding.

Section 1: Initial research pooling initiative

Q1a. What has been the impact of the initial research pooling initiative?

- Since ETP was created 10 years ago, it has attracted £3.2M of industry investment into its Energy Industry Doctorate Programme. This has created and supported 107 PhDs, in a total Doctoral programme scale of over £8M of additional investment in ETP's core pooling funding.
- Each ETP PhD student is co-supervised by an academic researcher in a different ETP partner university, and by an industrial sponsor.
- Because of the robustness of its cross disciplinary, collaborative model, ETP has been awarded the Knowledge Exchange Network (KEN) by Scottish Enterprise and the Scottish Government on 4 successive funding rounds, covering 10 years. The KEN has invested £6M of additional funding in ETP, connecting SMEs and large-scale energy industry companies to academic expertise.
- The KEN has formally supported almost 600 Scottish companies, and carried out 170 KE projects between academia and industry.
- The ETP Advisory Board is a high level governance and challenge forum providing strategic advice and input to Scotland's energy related research, development, demonstration and deployment (RDD&D) activities. It comprises public sector and industry stakeholders such as SE, HIE, SFC, SR, the Scottish Government, OREC, ESC, SPEN, SSE etc.
- Membership of ETP has grown from the original co-investing 11 members to 13, with the addition of UHI and GSA.
- The Doctorate programme has enhanced research by placing over 100 doctoral students amongst members and industrial sponsors.
- The ETP Annual Conference typically hosts 150-200 delegates, showcasing current research expertise in the energy sector.
- The annual Energy Innovation Emporium is an outward facing event, aimed at the academia-industry-public sector nexus. Co-hosted by all the SFC research pools with an energy component, it is a truly multi-disciplinary event, providing unique insights into global challenges. Output from this event has gone on to inform and contribute to the Scottish Government and its Energy Policy.
- ETP has direct partnerships through the KEN with WES (Wave Energy Scotland), ESC (Energy Systems Catapult), and OREC (Offshore Renewable Energy Catapult).
- The Directors of ETP were heavily involved in the setting up of the Oil & Gas Innovation Centre (OGIC) and other ICs, and colleagues are on the Boards of relevant ICs. Their experience through service on and experience of ETP and the KEN provided foundation experience for OGIC, and gave the public sector investors confidence on ROI.
- Themes Groups, led by Theme Coordinators with representation across partner HEIs, provide coordination to develop and maximise the impact of each of the theme areas, promoting knowledge exchange and collaboration across the theme, and highlighting new collaboration and funding opportunities.

- ETP has close connections with Scottish Enterprise, HIE and Scottish Development International (SDI), particularly through the Scottish Energy Laboratory (SEL). SDI used ETP as the connector to the academic energy sector, and in this capacity, ETP has hosted inbound delegations from Taiwan, Australia, the USA, Canada, Germany, and Austria.
- Due to ETP's strength and distinctiveness, it was invited to join the ENSEA (European North Sea Energy Alliance), an FP7 INTERREG Regions of Knowledge programme, as the Scottish Academic Partner, as well as being the lead for its Research and Education working group. The focus of ENSEA was the integration of energy systems, involving optimising the design and performance of the supply of all forms of energy (electricity, heat, biofuels and other fuels) at all scales (end user, local community and regional levels). Outputs have included an international conference, policy briefs, and joint applications for funding.
- The ETP model has gained wide and deep respect and has been replicated in the UK and internationally. It was the vanguard of similar investments in the SW, NE and midlands of England. The Chair of ETP recently submitted an invited paper on the ETP model to the Chief Scientific Advisor for the UK.
- The structure of ETP attracted particular interest from Taiwan. ETP met with Taiwanese delegations on three occasions, discussing ETP strategy and operation and its relevance to the Taiwanese energy sector.
- There was direct referencing to the ETP collaborative research communities in a number of successful EPSRC CDT bids, led by various ETP member universities. This was undoubtedly influential in presenting a strong and coherent environment providing a backdrop for these high quality PhD cohorts.
- There would not have been a ~42% BERD contribution (~£3M) from industry as part of the 100+ PhD Industrial Doctorate Programme.
- Participation in the ENSEA project would not have happened without pooling.
- Pooling has brought closer collaborative working between HEIs in terms of R&D activity
- The Knowledge Exchange Network (KEN - see below) would not have happened without pooling.
- The development of industry ready energy related PhD training cohorts contributing to innovation and competitive uplifts.
- The success of the ETP research pool, which led to the KEN, means that research has been brought closer to industry, changing the KE landscape and the culture within academia.
- Through the KEN, ETP has supported 600 companies to carry out 170 Knowledge Exchange projects between industry and academia, creating 512 jobs, increasing aggregate turnover by £124M, and abating 1.5Mt of carbon.
- The KEN has given additional impact to research: the KE projects have gone on to win at least £2.9M of follow-on funding, with funding coming from KTP, Energy Catalyst, ISCF-PFER etc.
- ETP and academic members of staff made extensive contributions to the gearing up of the OREC, including Chairing the Academic Research Advisory Group; contributing to their Research Strategy and Academic Engagement Plan.
- As cited elsewhere, the development of the UK's and Scotland's strategic international research agenda would benefit from closer interaction between pools and Innovation Centres.

Q1b. What lessons can be learnt from the research pooling initiative?

- Focus on research quality and strategic impact/ outcomes across Pool activities are essential.
- Pooling also helps the smaller HEIs, and is useful in creating additional research capacity in Scotland.
- The research pooling initiative has positively affected the way in which individual researchers and HEIs have collaborated.
- For maximum added value and return on SFC investment, it is essential that the host institutions, at department or school level subscribe fully (strategically and financially) to the ideals of the pooled partnerships, to unify thematic activities across the pool.
- Graduate schools are a particularly effective way of creating a culture of collaboration, and enabling researchers to gather under a common cause of capacity building. Out of this comes further joint initiatives, funding applications, shared successes and consequently visible output.
- Pooling helps academia in 3 specific areas:
 - Greater self- and mutual awareness of opportunities for collaboration.
 - More effective and wider engagement with industry viz. investment in BERD in co-funded PhDs and KE projects
 - Encourages and supports early career researchers, and PhD students, to build networks
- PEER & PECRE have had a very positive effect in building capacity, competence, and networks. They have had specific impact on Early Career Researchers (ECRs), which is a segment of academia under-represented generally.
- The prospecting, husbandry and management of opportunity to bid for substantial collaborative awards has had a positive effect on partner HEIs. Discussion at ETP Board level and strategic collaborative bidding has ensured maximum effectiveness for the available funding.
- Through promoting collaborative working, the pools have helped researchers and institutions break down barriers and become more innovative in the range of solutions. This has also created a sense of community among researchers from disparate disciplines.
- ETP is more broadly based than some other Pools and this has created a strong basis for cross - disciplinary / -institutional collaborations addressing high impact challenge areas
- Location is less of a barrier than institutional inertia or constraint.
- The programme would benefit from a central SFC programme manager to support and link each pool's activities for greater cohesion and cross-fertilisation.

Section 2: Pooling now and in the future

Q2a. In the current research landscape, what is the perception of, and role for, the pools?

- ICs have come into being since ETP was created. However, we see the existence of ICs as having a positive effect on the academic/industry interface – ETP’s activity complements and resonates with that in the ICs involved in energy (OGIC, IBioIC, CS-IC, CENSIS), simplifying the SME’s innovation journey. ICs are also contributing to the culture of academia-business collaborations and the effectiveness of relationships with industry.
- ETP also has close working relationships with other innovation translators: our KEN Marine Energy BDM is shared with Wave Energy Scotland (WES); our KEN Energy Systems BDM is shared with the Energy Systems Catapult (ESC); and the KEN Wind Energy BDM is shared with Offshore Renewable Energy Catapult (OREC). This has created added value for our industrial partners as it has given them access to a wider range of support and expertise, as well as fostering a complementary approach between the translators themselves.
- The ETP Board, constituted of representatives of each of its 13 partner HEIs, at its last meeting, committed to supporting ETP until 31st March 2022. So yes, our institutions remain as committed as ever to the concept and reality of pooling.
- The types and focus of funded research in energy has evolved over the last 10 years. It is becoming more interdisciplinary, and challenge-led. In response to this, ETP’s thematic model is also evolving, to include researchers in the policy, economics and social sciences as well as engineering and physical sciences.

Q2b. Should research pools have a continuing role in the Scottish research base?

- Yes, absolutely. At the most recent meeting of ETP’s Board there was agreement to continue to support the pooling effort beyond the current cut-off point, which demonstrates support for the principle and the benefits it generates.
- When the continuation funding comes to an end, ETP members have committed to making available matched funding, subject to continued core SFC funding of the next phase. This will enable ETP to build on its core programmes of PhD provision and engagement with industry, and capitalise on what has evolved to be a valuable, distinctive, collaborative R&KE community working in an area of global significance.

Section 3: Anything else

- The Energy Industry Doctorate Programme is open to all ETP partner HEIs. This includes making studentships available (on merit) to Scottish HEIs not included in EPSRC’s Doctoral Training Partnership (DTP) programme.