

Protecting and promoting organisational capability in process safety - lessons from the energy sector

1. Executive Summary

The energy sector is central to the realisation of a greener future, yet the expertise needed to deliver this safely from now and into the future is not secure. At a roundtable event in July 2024, IChemE brought together a range of experts from industry and other professional bodies to discuss this challenge and how to address it.

There is an urgent need to attract more people from all backgrounds into process safety roles, recognising that ‘green energy’ has significant process safety challenges.

- ***Governments should work with professional bodies such as the IChemE to highlight the role of process safety in ensuring a safe and sustainable transition in energy and ensure that appropriate pathways are available for young and older people to enter the profession.***
- Employers of all sectors should continue to report significant skills gaps in process safety, including lack of practical skills among university graduates.
 - ***Recommendation – universities and employers should consider how to better support the development of practical skills in young engineers, including a significant increase in the number of workplace placements.***
- There is an opportunity and a need for internationally recognised standards for process safety in all sectors, including green energy. Such standards or accreditations have the potential to provide crucial reassurance to the public.
 - ***Recommendation – governments should prioritise the development of appropriate process safety standards, in consultation with the IChemE and other expert professional bodies.***
- There is a lack of awareness of the importance of process safety within the energy and related sectors and among policymakers, ironically driven by the relative lack of high profile process safety related incidents in recent years. This increases the risk of ‘knee-jerk’ policy responses to significant process safety incidents.
 - ***Recommendation – employers and expert bodies including the IChemE should raise the understanding and profile of process safety with policymakers through a variety of means, including site visits, discussions and policy ideas.***

2. Introduction and background

Safe operations are fundamental to all sectors. The UK, Australasia and many other countries face significant challenges in ensuring the expertise and skills required for process safety are available and able to continually improve. We are facing a perfect storm, as an increasing demand for energy and increased demands on the workforce combines with a potential loss of significant human capital and organisational know-how as sectors such as oil and gas adjust to a low carbon future.

On 16th July 2024, IChemE hosted a roundtable event in London considering organisational capability in process safety (building it, retaining it, and being able to transfer it into emerging sectors particularly in low carbon energy sectors). The discussion involved representatives from a range of sectors including water, clean energy, oil and gas and nuclear. Trish Kerin, the IChemE Safety Centre Director chaired the session.

This document summarises main themes from the discussion and outlines conclusions and recommendations.

3. Emerging themes

3.1. The 'hourglass' demographic of the process safety workforce

Attendees saw process safety as a more established field than ever but agreed that practice remains inconsistent within and across sectors. There were concerns around smaller and newer companies. They may find it hard to secure specialised capacity, may have not been in existence long enough to have built up sufficient organisational knowledge or may not realise its importance.

Attendees noted a concerning demographic gap, particularly in the energy sector workforce, with a significant proportion of professionals at the top end of the working age range and a large number of young professionals, but not as many in between. This 'hourglass' workforce distribution was seen to pose significant challenges for retaining process safety capability going forwards. It was noted that a loss of practical knowledge from the workforce could also impact on the quality of new staff onboarding, with a resultant long-term loss of 'corporate memory' alongside skills.

3.2. Attracting more people of all backgrounds to work in process safety

Attendees agreed that, while important to attract new talent into the process safety workforce, it was also crucial to encourage mid-career professionals to consider lateral moves – either back into process safety or as career development – into process safety roles and pathways. To achieve this, reskilling and upskilling would be key.

It was noted that Governments, assisted and advised by professional bodies, like the IChemE, have an important role to play in encouraging people into engineering in general. Transition between sectors, for example, oil and gas into renewable energy should be encouraged. This should include policymakers signalling that the energy industry is of key strategic importance, will be invested in and that people can expect to see opportunities there in the future.

IChemE was also seen as having a crucial role to play in championing, coordinating and communicating the career paths that are open to people in process safety.

3.3. Ensuring process safety lessons are not forgotten

It was felt that the (thankfully) relative lack of high profile process safety-related incidents in recent years means that many younger professionals have no memory or experience of living through

events such as Flixborough, Bhopal, Chernobyl or Buncefield. Ironically therefore, the energy and other sectors risk being victims of their own success and must guard against this lack of awareness leading in any way to reduced awareness or readiness.

It was noted that process safety incidents do still happen, albeit often at a lower level. However, as has been seen recently, increased media coverage results in small incidents having the potential to be highly significant and damaging – particularly those involving pollution and disruption.

3.4. Developing practical skills for and within the process safety workforce.

Attendees noted a specific gap in many process safety environments regarding suitably qualified and experienced persons (SQEP). In particular, there was felt to be a gap in terms of practical experience and skills in process safety, particularly among younger workers who may have been educated using a variety of on-line technologies. It was noted as a good thing that many such people have a strong regard for processes and regulations. However, a relative lack of hands-on experience during their studies and early career could, in some cases, leave gaps in essential process safety knowledge and 'know-how'. For example, attendees spoke of valves being installed backwards and not being identified in inspection by professionals who had not had previously encountered such equipment first hand.

It was felt this lack of practical experience may be driven by an understandable desire to have professionals spend less time on potentially hazardous sites, coupled with professionals gaining less practical experience during their education. It was noted that a recently qualified graduate could progress through university and into a consultancy, working on highly complex plant projects without ever having been 'on site'.

A particular emerging skill gap was noted for the nuclear sector, regarding the chemical engineering skills needed for chemical processing plants. Previously, as UK policy has been to retrieve and store nuclear waste, this specific and specialised skill set has not been required. However, as reprocessing becomes a viable option, process safety skills in this area will be vital.

Attendees suggested actions to address skills gaps, such as those identified, could include

- Creation and wider adoption of competency frameworks, allowing professionals and organisations to identify gaps in knowledge.
- Increased placement/industry interaction opportunities for students and others to gain practical experience alongside encouragement and support for employers and universities to make this happen.

3.5. Process Safety Standards

It was noted that there are currently no international standards for process safety. The Energy Institute's High Level Framework for Process Safety Management provides scalable 'best practice' guidelines that can be used across the energy sectors. IChemE has been active in a push to develop an international process safety standard. It was felt important for organisations such as the IChemE and government to champion and support development of international process safety standard.

The discussion noted that approaches to regulation vary between jurisdictions – for example, the UK approach is goal-based while others may implement standards through more prescriptive regulatory requirements. Codes of practice can offer an effective way forward.

Attendees discussed the merits of a Kitemark or high profile ‘accreditation’ for process safety which could be awarded to projects or organisations. This was also seen as a way of providing assurance to regulators and the public around high standards of environmental awareness and protection. It was agreed this kind of mark would provide some informal form of ‘social license to operate’, giving local communities confidence regarding energy or other process operations in their area.

3.6. Raising the profile of process safety among policymakers and senior leaders

Attendees agreed on the need to raise the profile of process safety among policymakers, politicians and senior leaders in industry and academia. It was agreed that it is important to do this constructively and proactively, to ensure balanced approaches rather than knee jerk reactions to a headline grabbing event. It was agreed a range of activities could raise awareness and understanding of process safety among these audiences including site visits and simulations. It was also noted that process safety had something attractive to offer senior leaders – by presenting a number of business benefits such as protecting effective plant operations and preventing accidents. Great British Energy Attendees noted the new UK Government’s ambition on delivering green energy, and the pivotal role of Great British Energy in delivering this. Great British Energy’s economic influence over the whole sector should enable it to set standards, norms and expectations. It was felt it should model good safety behaviours and demand it of others.

It was agreed there is an important role and clear value for governments in promoting process safety in green energy. This includes supporting and encouraging public confidence in the new technologies and behaviours required, so encouraging adoption and use.

4. Conclusions and Recommendations

- There is an urgent need to attract more people from all backgrounds into process safety roles, recognising that ‘green energy’ has significant process safety challenges.
 - **Recommendation – governments should work with expert professional bodies such as the IChemE to highlight the role of process safety in ensuring a safe and sustainable transition in energy and ensure that appropriate pathways are available for young and older people to enter the profession.**
- Employers of all sectors, including existing and new energy providers, continue to report significant skills gaps in process safety, including lack of practical skills among university graduates.
 - **Recommendation – universities and employers should consider how to better support the development of practical skills in young engineers, including a significant increase in the number of workplace placements made available in process safety environments.**
- There is an opportunity and a need for internationally recognised standards for process safety in all sectors, including green energy. Standards or accreditations have the potential to provide reassurance to the public. – so assisting adoption of new technologies and behaviours.
 - **Recommendation – governments should prioritise the development of appropriate process safety standards, in consultation with the IChemE and other expert professional bodies.**

- There is a significant lack of awareness of the crucial importance of process safety within the energy and related sectors and among policymakers, ironically driven by the relative lack of high profile process safety related incidents in recent years. This increases the risk of ‘knee-jerk’ policy responses to significant process safety incidents if one should regrettably occur.
 - ***Recommendation – employers and expert bodies including the IChemE should raise the understanding and profile of process safety with policymakers through a variety of means, including site visits, discussions and policy ideas.***

About IChemE

The Institution of Chemical Engineers (IChemE) is the qualifying body and learned society for chemical, biochemical, and process engineers in the UK and worldwide, with over 30,000 members. Our mission is to champion the input of chemical engineers to create a sustainable future. We support our members in applying their expertise and experience to make an influential contribution to solving major global challenges, and are the only organisation permitted to award Chartered Chemical Engineer status and Professional Process Safety Engineer registration.

Find out more about IChemE and our strategic vision of Engineering a Sustainable World at [icheme.org](https://www.icheme.org)

The IChemE Safety Centre is a not-for-profit multi-company, subscription based, industry consortium, focused on improving process safety. It shares, analyses and apply safety related thinking.