

## Safety & Loss Prevention Special Interest Group Climate Change Action Plan

<p>Introduction Overall problem statement</p>	<p>The Safety and Loss Prevention Special Interest Group (S&amp;LP SIG) notes IChemE's <a href="#">position on climate change</a>.</p> <p>The action plan presented here follows on from this statement and forms part of IChemE's delivery against several of the commitments set out, namely to; develop detailed positions and action plans for economically sustainable and secure transitions to net zero carbon emissions in all areas of chemical engineering practice and regions where members are active. It will also help underpin work on several other commitments, including provide policy advice to governments based on chemical engineering experience and expertise; engage in public outreach activities with businesses and communities, to understand their concerns about the threats and uncertainties posed by climate change; develop training courses and mandate CPD to provide the knowledge and skills to support members in the transition to a net zero carbon economy and in climate change adaptation; encourage all regional members groups and special interest groups to hold webinars and seminars as part of the CPD programme to enhance skills and knowledge in pursuit of zero carbon futures and understanding of climate risks, and to engage with the wider membership.</p>
<p>Specific problem statement</p>	<p>Our role in the S&amp;LP SIG is to promote and support the development and implementation of good safety practices across the process industries. The development of new processes and sectors to tackle the climate emergency could pose significant process safety risks if the learning, experience, and knowledge from other sectors is not applied in these developments. In addition, the maintenance of existing process industries during the transition to net zero may also pose a significant risk if existing skills and resources are diverted to focus on new sectors and industries. Both scenarios could generate unintended consequences which may affect our ability to achieve net zero in a positive manner ensuring safety and holistic environmental protection as well as supporting economic sustainability.</p>
<p>What actions need to be taken to address the issue?</p>	<p>We believe the expertise and experience held by the SIG, working collaboratively to support others, or leading in our own areas of expertise, could help ensure these potential problems are solved.</p> <p><b>Q1:</b> What is the specific problem related to climate change in S&amp;LP SIG's area?</p> <p><b>A1:</b> Action on climate change requires actions by the process industries. These actions may be:</p> <p><u>Proactive</u> actions (mitigation or adaptation of activities to avoid <u>contributing to</u> climate change), ie net zero developments.</p>

Proactive actions include, for example, battery energy storage systems, remote operation of plant, emission mitigation systems (such as carbon capture systems), novel energy production distribution and usage systems.

The problems related to proactive actions include:

- adapting the existing approaches to process safety to new activities;
- adapting and expanding the existing community of practice in process safety to encompass new activities;
- ensuring collaboration to achieve the required activities with acceptably safe solutions.

Reactive actions (mitigation or adaptation of risks arising from climate change) inadequately protect existing or planned assets and prevent realisation of their associated hazards.

The aim of reactive actions is avoidance of events such as Fukushima 2011, by appropriate defences against increased likelihood or severity of extreme events (such as "100-year waves/floods"). Generally, this requires review of (and where appropriate actions to mitigate risks of) existing designs, and adaptation of new designs to revised lifetime expectations of climate change related threats.

The problems related to reactive actions include:

- correct assessment of the risks;
- proportionate application of appropriate mitigation measures;
- proportionate adoption of appropriate adaptation measures.

**Q2:** How does climate change affect the area served by S&LP SIG?

**A2:**

1 Proactive actions

For S&LP SIG, promoting acceptable safety in any new activity (in this case, net zero developments) is "business as usual," but the business context is not necessarily the usual business of the process industries of the past, and the actors are not necessarily the actors of the past.

Ensuring process safety in proactive climate change led activities is a subset of process safety, but often with unusual scale or context (eg 36" carbon dioxide transmission lines, hydrogen containment on buses ...).

2 Reactive actions

Reactive actions are focused on current and continuing resilience, requiring review of whether what we have done in the past will still do.

Ensuring process safety in reactive climate change led activities is largely a subset of what is sometimes called "NaTech", ie addressing the interaction between nature (in this case driven by climate change) and (high hazard) technology (in this case existing technologies and design practices that may need to be adapted to climate change).

**Q3:** How does the area served by your group impact climate change?

**A3:** The area served by S&LP SIG permeates all aspects of the current and future process industries and other spheres where chemical engineers interested in safety are active. Acceptable safety, and health, and protection from acute (accidental) environmental impacts, needs to be in the mix of the overall objectives in all actions of the process and other industries (driven by climate change or otherwise).

	<p><b>Q4:</b> What is the link that S&amp;LP SIG has with these causes or impacts of climate change, including where S&amp;LP SIG influence might contribute to how they might be identified, estimated, measured, or addressed?</p> <p><b>A4:</b> There is great overlap between membership of the SIG and those members of IChemE who are engaged in industries whose activities are considered key to mitigation of or adaptation to climate change (within and outside the process industries). There is great overlap between membership of the SIG and members of IChemE who are well placed to identify, estimate, measure or help address activity of the process industries in relation to climate change. However, the focus of S&amp;LP SIG (and its members when acting in their S&amp;LP roles) is on acceptable safety, as part of the mix in any actions, rather than on what actions must be taken by whom and when. If the decision is to do “X”, then the role of the SIG and its members is to help to achieve X safely.</p> <p>In brief, S&amp;LP SIG believes that process safety principles can be applied to safely deliver any climate change activities. However, this will require all actors (new and old) to employ: the necessary management systems; and the necessary skills, expertise, and specialist knowledge. The main challenge for S&amp;LP SIG is to help ensure that these are brought to bear.</p> <p><b>Action</b></p> <p>S&amp;LP SIG needs to act to help ensure that policy drivers and technological solutions are adopted in a way that employ process safety principles appropriately, in whatever sector they are developed and deployed. Utilising our expertise, working with others, we will support and advise on policy change, especially where this requires existing policies to be adopted by new actors and adapted to new situations; and educational development, to extend and apply safety skills into new sectors and industries. The S&amp;LP SIG will, as the lead for this fundamental subject running through all sectors, engage with other SIGs, regional members groups and external stakeholders (including other Professional Engineering Institutions) and will collaborate with them in the promotion of process safety management, including any specific activities addressing climate change. This collaboration is essential to deliver new or novel process designs and operations which help solve the climate crisis and are acceptable from the perspectives of:</p> <ul style="list-style-type: none"> <li>■ sustainability including the circular economy;</li> <li>■ economy;</li> <li>■ controllability;</li> <li>■ operability;</li> <li>■ safety;</li> <li>■ health and environment (short and medium term impacts).</li> </ul> <p>Our role is to help ensure that safety retains its proper place in the mix of objectives for any project supporting increased sustainability and tackling the impacts of climate change.</p> <p>To achieve this the S&amp;LP SIG will work collaboratively with other SIGs and working groups within IChemE to ensure that collective knowledge and networks are used to deliver support and outcomes on climate change as part of a holistic approach through IChemE.</p>
<p>What skills, training gap or facilitation requirements need to be addressed?</p>	<p>There is a need to promote and transfer the skills, expertise, and specialist knowledge of the SIG membership, applying them to address the challenges of climate change. This includes supporting chemical engineers, when trained to have an appropriate understanding and ability to identify potential threats associated with climate change eg from more extreme weather events, to be</p>

	<p>able to apply this to specific sites or processes to assess risks to deliver safe, and resilient operations.</p> <p>To support this development the S&amp;LP SIG aims to promote the importance of safety leadership in the application of net zero technologies and in adaptation to climate change.</p> <p>The key challenges are ensuring that new actors (often not IChemE members) are aware of, value and engage the relevant skills, expertise and specialist knowledge needed; education and training are adapted to promote the relevant skills, expertise, and specialist knowledge to new audiences.</p> <p>IChemE has mature mechanisms for delivering the CPD needed. S&amp;LP SIG is pursuing a programme of webinars to raise awareness of the need to bring to bear relevant skills, expertise and specialist knowledge when carrying out net zero developments and improving resilience.</p> <p>S&amp;LP SIG will also encourage members to engage and support the identification and production of relevant technical guidance.</p>
<p>What actions will you encourage others to take?</p>	<p>S&amp;LP SIG has a significant part to play in supporting others' adaptation to new challenges arising from activities addressing climate change.</p> <p>With our focus on acceptable safety, as part of the mix in any process or project, we will continue to encourage others to be aware of, value and employ (particularly at the early stages of novel developments):</p> <ul style="list-style-type: none"> <li>■ the necessary management systems for achieving acceptable outcomes in safety (and health, and protection from accidental environmental impacts);</li> <li>■ the necessary skills;</li> <li>■ expertise and;</li> <li>■ specialist knowledge to underpin those management systems.</li> </ul>
<p>Next steps</p>	<p>Process safety transcends disciplinary boundaries and concerns a wide range of professions including chemical, mechanical, instrumentation &amp; electrical engineers, scientists, and accountants. Climate change activities provide a new context in which S&amp;LP SIG will pursue its aims to:</p> <p>Facilitate networking and open dialogue on lessons to be learned:</p> <ul style="list-style-type: none"> <li>■ encourage and support professional development;</li> <li>■ providing resources for training;</li> <li>■ acquisition of new skills;</li> <li>■ promote best practice;</li> <li>■ spreading this between industries and;</li> <li>■ between institutions and between professions.</li> </ul> <p>Note: Any opinions are those of the authors and do not necessarily represent those of IChemE.</p>