IChemE Clean Energy SIG
Climate Action Plan

Michael Green - Immediate past Chair of Clean Energy Special Interest Group
IChemE aims to take a lead role in tackling climate and has developed a position statement in consultation with members which it published in November 2020.
Position Paper on Climate Change

Introduction to IChemE Climate Change Paper

IChemE Basic Climate Change Principles

What do these principles mean for IChemE Members?

What do these principles mean for traditional sectors within which members work?
Introduction to IChemE Climate Change Paper

- IChemE accepts the IPPC science and conclusions of significant environmental damage, and efforts are required to decarbonise and stabilise temperature rise to 1.5 °C.

- Chemical engineers are uniquely placed to take action across industrial sectors to reverse the damage to the planet’s life support systems, by:
  - Analysing the emissions and causes which lead to climate change.
  - Mitigate against climate change via holistic (e.g. LCA) and robust processes.
  - Halting the effects of climate change by further developing CCS processes, both technological and nature based.
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<thead>
<tr>
<th>Column</th>
<th>IChemE Principles</th>
<th>Comment</th>
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<tbody>
<tr>
<td>1</td>
<td>Net Zero.</td>
<td>To limit the increase in global temperature to 1.5 °C which will require net emissions of carbon dioxide and other greenhouse gases to be reduced to zero.</td>
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<tr>
<td>2</td>
<td>Reduction start NOW.</td>
<td>Action to start immediately for 1.5 °C. (GHG) emissions reduce by 7.6% yearly to 2030 or 50% each decade from now to 2050.</td>
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<td>3</td>
<td>Guided by UN Sustainable Development Goals. (17 goals)</td>
<td>Endorse SDGs to minimise adverse impact and not shift impact elsewhere – either geographically, socially, economically, or environmentally.</td>
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<td>4</td>
<td>Systems thinking</td>
<td>Life cycles emissions and the circular economy, must be encoded in industry standards for planning, design, construction, operation.</td>
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<td>5</td>
<td>Global mechanisms</td>
<td>Governments take responsibility for the total emissions from their economies and work to meet the goal of net zero by 2050</td>
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<td>6</td>
<td>Best available techniques</td>
<td>Make use of best available techniques (BAT) to mitigate the effects of climate change.</td>
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<td>7</td>
<td>Innovation</td>
<td>Support for new technologies and processes to deliver net zero emissions at the pace required. Encourage R&amp;D for the new best solutions.</td>
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<td>8</td>
<td>Training and application of skills</td>
<td>Work with members and the industries they work in to support the education, training and application of skills of the current and future workforce.</td>
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<td>9</td>
<td>Education</td>
<td>Accredit education to embed the fundamental principles of sustainability, social responsibility and ethics in the education of chemical engineers.</td>
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What do these principles mean for IChemE Members and where they work?

IChemE duty, as a learned society and set out in our Royal Charter, is to bring community benefit and safeguard the public interest by committing to:

• Update its Code of Conduct, and policy advice to Governments to act in accordance with the principles of sustainability including the UN SDGs.

• Design guidelines, promote research (academic and industrial) and share knowledge through our range of publications and international contacts and SIG and Member Group webinars.

• Achieve net zero from our direct operations by 2025, publish annual data and invest in line with our climate change goals. Review every two years.

• Accredit university degrees, align medals and awards, and offer training courses and CPD with zero-carbon economy and the UN SDGs.

• Encourage all industrial sectors to monitor secure transitions to net zero carbon emissions in all areas of chemical engineering practice.
Industrial Decarbonisation Opportunities for Chemical Engineers

- Government commitment of £1B for the five CCS Cluster Projects
  - **East Coast Cluster.** “End to end value” decarbonisation of Teeside Industrial Cluster CO2 transport – BP leading. ZCH (Zero Carbon Humber), DelpHYnus project. (50% of industrial cluster emissions)
  - **Hynet North-West** Infrastructure – 75,000 jobs
  - **Scottish Cluster** – Acorn CCS. 3.7GW of H2 and 5Mt CO2/2030. 15,000 jobs. Peterhead/St Fergus CO2 station. SNZ Roadmap
  - **V Net Zero Immingham.** CCS plant
  - **S Wales.** 16Mt/yCO2 reduce to zero. Shipping of CO2
  - **Black Country.** Emphasis on 295,000 small manufacturing

SSE Keadby Power Station, target for CCS by 2020’s

HyDeploy Hydrogen Gas grid, in the North-West
UK H2 Strategy
(Opportunities & Consultation)

- **Strategy Key Points**
  - £240M New Zero H2 fund
  - Consultation on CfD scheme
  - 5GW of H2 by 2030
  - Standard for H2 net zero production
  - Twin track Blue and Green. H2
  - Impact of H2 on Industrial and Chemical Processes
  - Training for transition to H2 jobs

- **Challenges**
  - Costly to produce
  - Technological uncertainty
  - Policy & regulatory uncertainty
  - Need for enabling infrastructure:
  - Need for supply & demand coordination:
  - Need for FOAK and NOAK investment deployment:
  - Real life cycle Analysis of Blue H2 and Nat Gas.
  - Lack of evidence on impacts, people and profit.

- **Scope for Chemical Engineers**
  - Provide LCA
  - Blue v green system analysis,
  - Produce real evidence

- Changes facing Clean Energy SIG Members
- Actions proposed for CESIG Membership
- CESIG Draft Action Plan (next 12 months)
- CESIG Planned Achievements (2024 and beyond)
- Climate Change Action Plan Survey
Clean Energy SIG Climate Change Context and Draft Action Plan

- The plan will underpin the SIG’s work to:
  - Develop training, webinars and mandate CPD to support members in the transition to a net zero carbon economy.
  - Enhance skills and knowledge in pursuit of zero carbon futures and understanding of climate risks, and to engage with the wider membership.
  - Engage in public outreach activities with businesses and communities.
  - Provide policy advice to governments.
Career Changes facing Clean Energy SIG Members

• The Clean Energy SIG has chemical engineers who are involved across the whole energy supply chain, well to wheel, heating, processes.

• The path to net zero will see a major restructuring across industry, transport, heating and power generation. Some sectors will diminish while other new sectors such as CCS, hydrogen, solar (PV), wind and bioenergy will expand.

• Social and behavioural factors could include changes to diets, smart home energy use, and demand for aviation. This will require chemical engineers to work with other professions including social scientists and communications specialists.
Actions proposed for CESIG Membership

- The CESIG will continue to publicise and actively drive the development and implementation of the decarbonisation technologies

IChemE’s CESIG needs to:
- Drive and **build consensus** amongst Chemical Engineers to take rapid action on climate change.
- Take a **technology neutral**, system led, stance and make robust science and engineering inputs.
- Develop and **expand knowledge** in the low carbon space.
- Support next generation of Chemical Engineers and **educate and inform**, across all sectors and demographics.

- **Skills will be needed in the following areas** –
  - Change management.
  - **Policy and policy** change.
  - **Communications** to support the professional delivery of articles and presentations that “land well”, to expand the audience.
  - **Networking** and workshop techniques, including social media.
  - Educational materials.
  - **New technologies** including digitalisation and artificial intelligence, energy storage, solar, heat storage, fuel cells, life cycle analysis, carbon economics.
CESIG Draft Action Plan
(next 12 months)

Reviewing CESIG ways of working. To include

• Review the CESIG’s ToR (Terms of Reference) and Key Performance indicators (KPIs) and report annually.

• Build up CESIG committee’s membership and fill the skills gaps, e.g. social media, materials, battery chemistry, hydrogen.

• Update the annual planning process for annual theme, blogs/articles, site visits, webinars, workshops, meetings.

• Identify and decide priority themes, prepare position articles and slide presentations on their impact for use in short articles, blog posts, e.g energy storage and solar in Australia.

• Use this expertise to provide rigorous science and engineering inputs into policy makers across Government (local and national), industry, other non-profit organisations.

• Support members working on the development of safety and new standards related to the decarbonisation agenda.

• Identify a set of communications for the key audience, aimed at IChemE CESIG members the wider IChemE, Government, industry, other NGO’s (IEA) and academic stakeholders.
CESIG Planned Achievements by 2024

By 2024, the CESIG Team will have:

• Reviewed and updated its planning process and identified annual objectives. **Priority Objectives** established.

• Widened **diversity** within the CESIG team with respect to areas of expertise, age and more early career members.

• Supported IChemE with **calls for evidence** where required.

• Recommend two **medals** awards, consistent with the IChemE’s position on climate change and, its selected priority themes.

• The variety of outputs generated by the CESIG will be valued by a wide variety of stakeholders. KPI data will evidence the value generated.

• **Younger CESIG team** members, attracted by the focus on decarbonisation technologies, will progress and become CESIG leads.
IChemE Clean Energy Special Interest Group
Climate Change Action Plan Survey

CESIG Climate Change Action Plan


CESIG Climate Change Action Survey

https://forms.office.com/pages/responsepage.aspx?id=FGi2l166wE6F51O8iXu95ibNxYl5Ra9KuqmL0cwNgQZUREZSOEgzNjIjWDJINjM2UUNOTDhRTFNJSC4u&wdLOR=c7EB5C17F-A1C8-424D-8680-A61BECBFFEC1