A GREEN ECONOMY: CPPT – "A WORKER'S TRANSITION"

Unite – the union for chemicals, pharmaceuticals, process and textiles workers

Unite the UNION

Hydrogen – CPPT and workers' transition

The existential threat to our planet through climate change is leading to a rethinking of the energy mix required to support decarbonisation across a range of industries, achieving a reduction in emissions and targeting investment in a net zero economy. Alongside other forms of energy, the global response is including the development of a Hydrogen economic model. If we continue as we are today, the world is set for at least 3°C of warming from pre-industrial levels.

The UK government is committed to contributing towards efforts to limit the temperature increase to 1.5°C. In June 2019 the UK Government introduced primary legislation that commits the UK to reaching a 100% reduction in greenhouse gas emissions known as Net Zero, by 2050. This legislation was based on the recommendation of the Committee on Climate Change's (CCC's) May 2019 report on net zero.[1] The CCC's report identifies that to implement this legislation extensive decarbonisation across the UK's economy is required. This also demands an industrial transition from incumbent fossil fuel utilisation to a low-carbon economy. It seems inevitable that a wide variety of technologies and energy sources will be utilised in order to meet the challenge. It is becoming increasingly clear that the use of clean Hydrogen as a secure and affordable energy source in support of decarbonisation will feature in the development of that net zero economy.

Unite members are strongly represented in energy and carbon intensive sectors heavily involved in fossil fuel sectors. Of the eight industrial sectors that currently emit around two thirds of industrial carbon emissions, four of these are contained in the Chemical, Pharmaceutical, Process and Textiles (CPPT) sector: **ceramics, chemicals, glass, and oil refining**.[2] Any signature development of hydrogen fuel technology and increased utilisation of hydrogen in our energy and fuel requirements is likely therefore to impact across a range of industrial sub-sectors in CPPT and have a degree of impact on our members.

Unite CPPT demands:

- A government led industrial strategy for the CPPT sector where jobs and communities are protected and supported by public investment and ownership, including a transition commission where workers' voice is represented.
- A dedicated, fully funded department of government whose sole focus is on a green economy and a Just Transition in, and for, the UK.
- Trade Union engagement and involvement at national, regional and sectoral level to support industrial strategies to deliver a just transition for workers.
- Public policy and investment to secure a positive future for workers in affected industries and communities with targeted economic investment in industry cluster areas.
- Identification and strategic planning to support green jobs that workers in affected industries will transition into.
- A skills transition policy with job and income protection for workers while developing any new and necessary skills.
- Supportive industrial relations landscape with access to workplaces for trade unions supporting fair work and good quality jobs.

[1] https://www.theccc.org.uk/wp-content/uploads/2019/07/2019-Progress-Report-Summary.pdf
[2] https://ourworldindata.org/emissions-by-sector

What is Hydrogen?

Hydrogen (H) is the most abundant element on earth but it rarely exists alone, therefore it is produced by extracting it from its compound and can be produced in numerous ways. Some methods produce CO2 while others are carbon free.

- Hydrogen can be renewable or decarbonised if produced using renewable or carbon free electricity.
- Hydrogen has the highest energy content of any common fuel by weight.
- Hydrogen is a high efficiency, low polluting fuel that can be used for transportation, heating, and power generation in places where it is difficult to use electricity or as a CO2 neutral feedstock for chemical processes (ammonia-fertilizers).

Hydrogen doesn't exist naturally on earth. Most hydrogen on earth occurs in water or organic compounds. Combined with oxygen, it is water (H2O). Combined with carbon, it forms methane, coal, and petroleum. It is found in all growing things.

Hydrogen has the highest energy content of any common fuel by weight, but the lowest energy content by volume. It is a high efficiency, low polluting fuel that can be used for transportation, heating, and power generation in places where it is difficult to use electricity. Hydrogen can be used in various industrial applications; in metalworking, flat glass production (hydrogen used as an inserting or protective gas), the electronics industry and applications in electricity generation.

The most important primary energy source for hydrogen production currently is natural gas, at 70%, followed by oil, coal and electricity (as a secondary energy resource). Steam reforming (from natural gas) is the most commonly used method for hydrogen production. To date, only small amounts of hydrogen have been generated from renewable energies.

Electrolysis currently accounts for around 5% of global hydrogen production. If hydrogen is extracted from water using a machine called an electrolyser, which uses an electric current to split H2O into its constituent parts and renewable or carbon free electricity is used, the gas has a zero-carbon footprint, and is known as green hydrogen.

Also, hydrogen-based chemistry could serve as a carbon sink and complement or decarbonize parts of the petrochemical value chain. Today, crude oil (derivatives) are used as feedstock in the production of industrial chemicals, fuels, plastics, and pharmaceutical goods. Almost all of these products contain both carbon and hydrogen (hence their name hydrocarbons). If the application of carbon capture utilization and storage (CCUS) technology takes off (as part of a circular economy or an alternative to carbon storage), the technology will need (green) hydrogen to convert the captured carbon into usable chemicals like methanol, methane, formic acid, or urea. This use of hydrogen would make CCUS a viable alternative for other hard-to-decarbonize sectors like cement and steel production, and would contribute to the decarbonisation of part of the petrochemical value chain.

Since Hydrogen production translates into extracting it from its compound by using energy from other primary sources, it is an energy carrier, which is used to move, store, and deliver energy produced from these sources. Hydrogen Europe has forecasted that hydrogen could create an accumulated investment of €52bn and 850,000 new jobs across Europe.

Current use of Hydrogen

The International Energy Agency[3] identifies the major uses of Hydrogen in society as:

- Dominated by **industry**, namely: oil refining, ammonia production, methanol production and steel production. Virtually all of this hydrogen is supplied using fossil fuels, so there is significant potential for emissions reductions from clean hydrogen.

- In **transport**, the competitiveness of hydrogen fuel cell cars depends on fuel cell costs and refuelling stations while for trucks the priority is to reduce the delivered price of hydrogen. Shipping and aviation have limited low-carbon fuel options available and represent an opportunity for hydrogen-based fuels.

- In **buildings**, hydrogen could be blended into existing natural gas networks, with the highest potential in multifamily and commercial buildings, particularly in dense cities while longer-term prospects could include the direct use of hydrogen boilers or fuel cells. It should be noted that there is concern that using hydrogen in domestic settings faces challenges such as leakages, condensation and flame safety concern.[4]

[3] https://www.iea.org/reports/the-future-of-hydrogen
[4] https://www.theengineer.co.uk/domestic-hydrogen-appliances/

- In power generation, hydrogen is one of the leading options for storing renewable energy, and hydrogen and ammonia can be used in gas turbines to increase power system flexibility. Ammonia can also be used in coal-fired power plants to reduce emissions.

Types of Hydrogen

Blue Hydrogen – Splitting natural gas and steam reforming

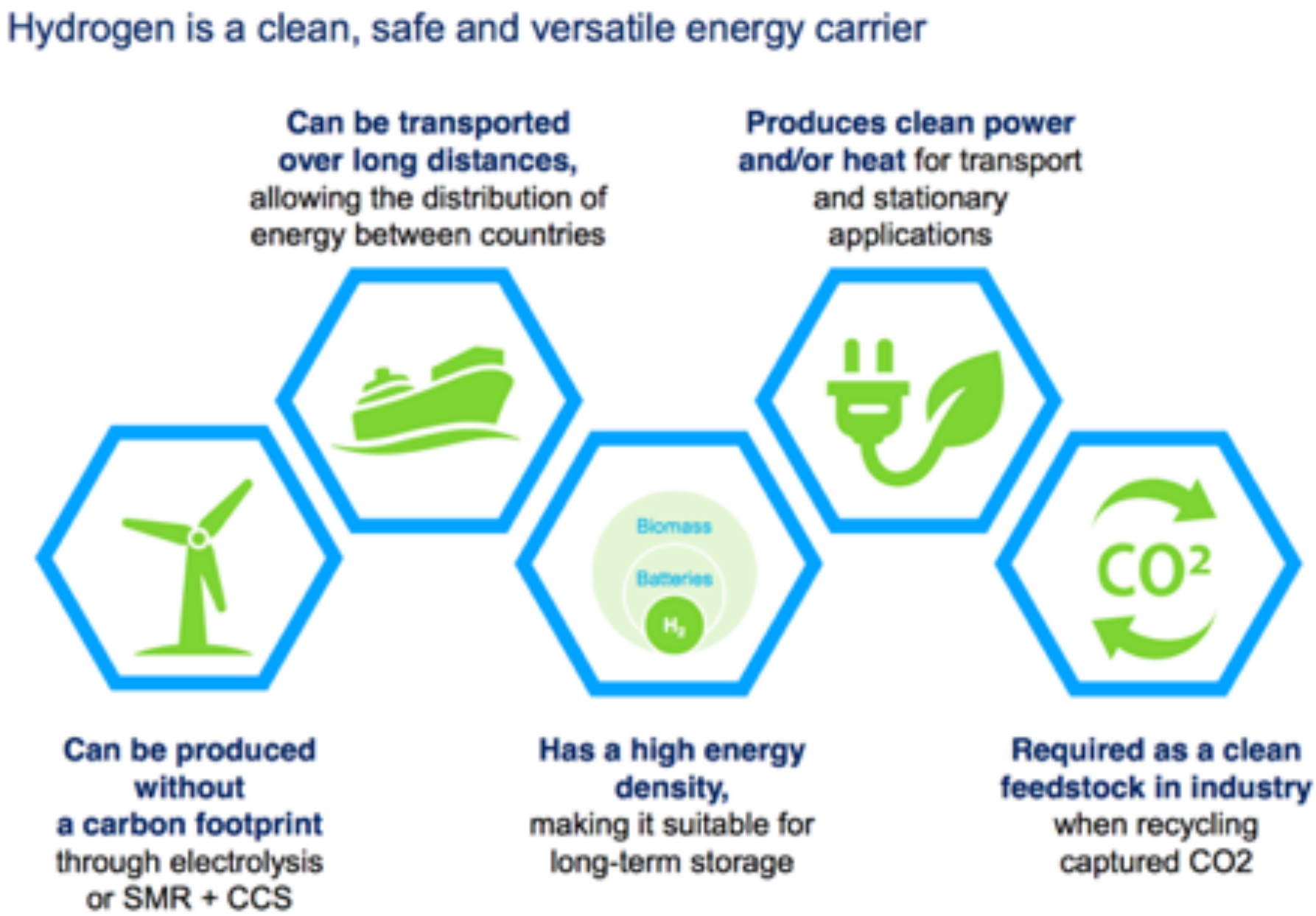
Blue Hydrogen takes carbon dioxide from the hydrogen making process and uses carbon capture and storage (CCS), to contain this. CCS is a technology that can capture up to 95% of the carbon dioxide emissions produced from the use of fossil fuels in energy generation, preventing it from entering the atmosphere and damaging the environment. Once the process of CCUS in blue hydrogen plants is scaled up and standardized, the cost is likely to come down. Innovation should eventually open up more opportunities for utilization of CO2 in industry, which may further push down the cost of CCUS. Those developments could bring the price of blue hydrogen closer to that of grey hydrogen sooner than is often assumed.

The key to the development of hydrogen production within the context of net zero through this method is ensuring that the carbon is utilised or stored safely without emitting into the atmosphere.

Green Hydrogen – Electrolysis and Renewable Energy

Green Hydrogen is made by a process of electrolysis using renewable electricity. The current challenge for the time being is that both solar and wind power do not have the existing infrastructure for large-scale green hydrogen to work.

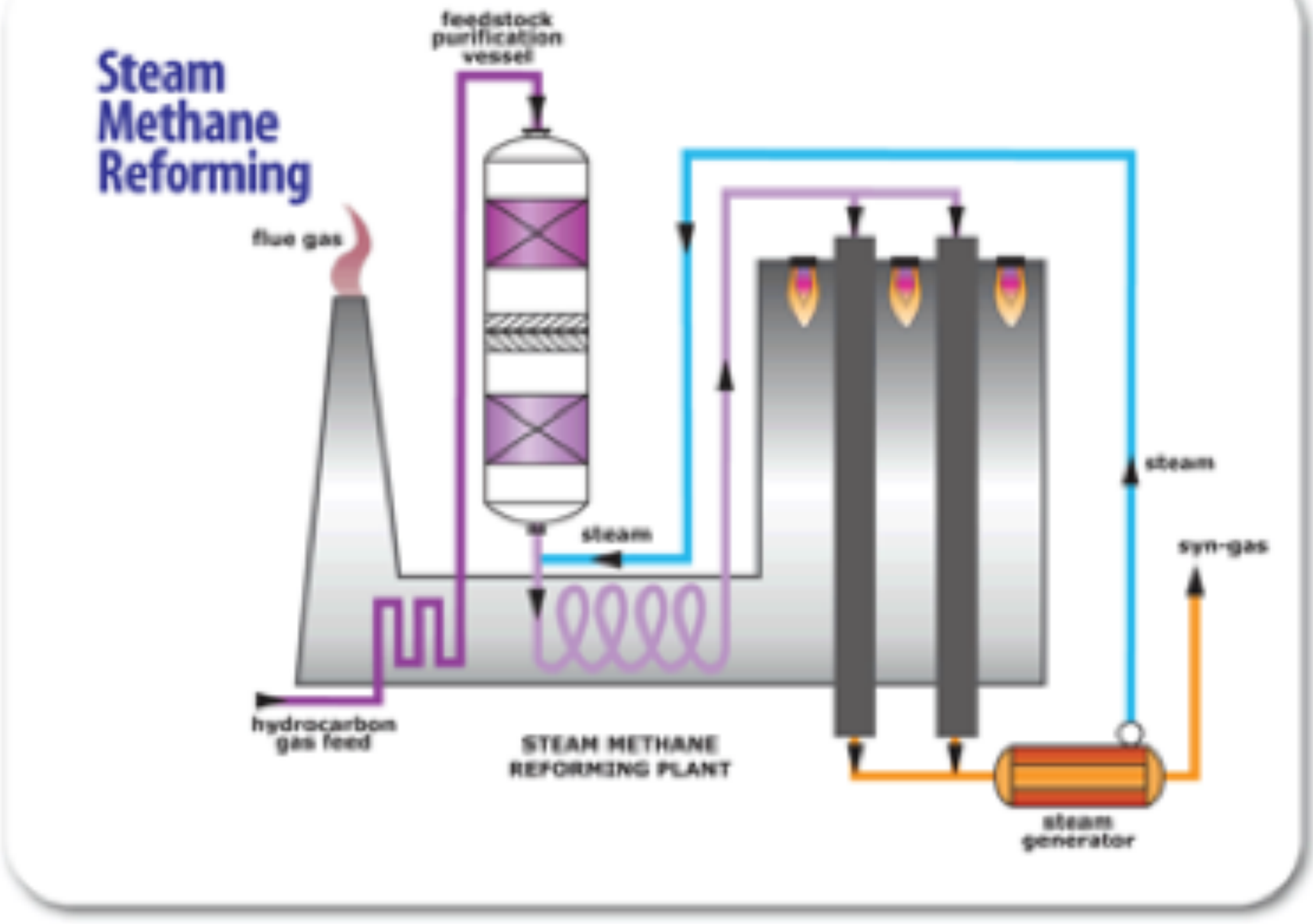
As recognised by the British Compressed Gasses Association, the potential to make hydrogen by green electrolysis of water is limitless given the right infrastructure. ITM Power is shortly opening a new factory in Sheffield, making it the largest electrolyser factory in the world. Increasing electrolyser production capacity in the 2020's to meet an exponentially rising global demand for green hydrogen



is a key opportunity for UK jobs creation by boosting export income.[5] The Hydrogen Taskforce has identified that renewable power generation technologies are currently the UK's most mature and cost effective decarbonisation solutions with more installed capacity of offshore wind than any other country in the world, and the costs of new offshore wind falling by 50% since 2015.[6] The experience of renewables to date however has not met with the expected jobs bonanza as the collapse of a deal between BiFab and EDF for the manufacture of eight turbine jackets to support the Neart na Gaoithe (NnG) offshore wind project identified. Investing in renewable infrastructure but offshoring the manufacturing jobs is of no help to workers and communities across Scotland and the UK.

Methods of hydrogen production

Hydrogen can be produced mainly through methods namely electrolysis and natural gas reforming process. The majority of commercial hydrogen is produced through the natural gas reformation process, which is considered to be a carbon-intensive process.



Whereas, in the electrolysis process, the water is split into hydrogen and oxygen in an electrolyser. The types of electrolysis processes include polymer electrolyte membrane (PEM) electrolysis and alkaline electrolysis.

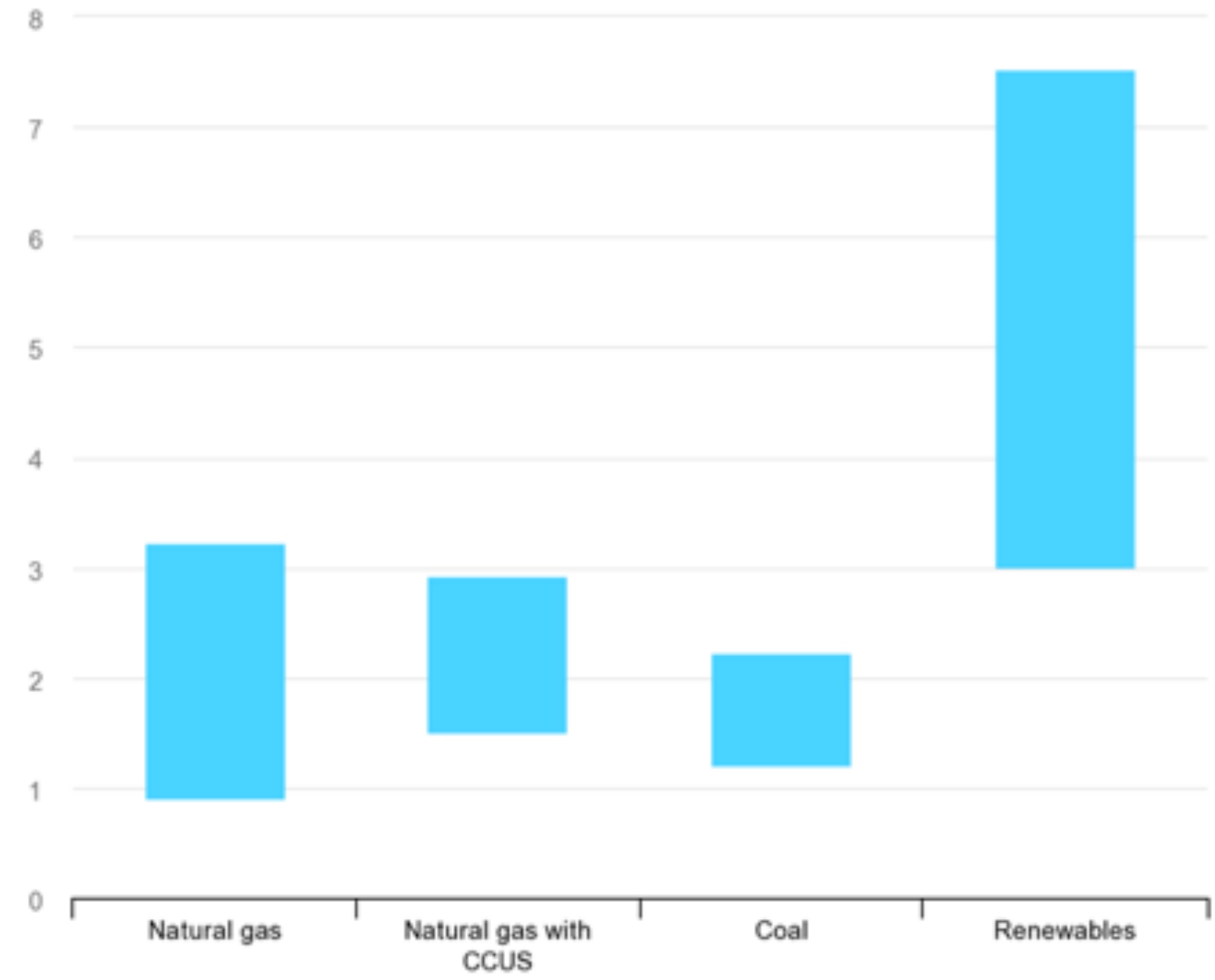
If the electrolysis process utilises electricity from renewable sources, the net carbon emissions associated with hydrogen fuel production becomes zero.

Hydrogen has the potential to decarbonise sectors across the UK economy including industrial process, transport and heat. Currently, there are two primary pathways that are used for hydrogen production; (i) the reformation of natural gas and (ii) electrolysis. Reformation, typically steam methane reformation, converts a stream of natural gas and steam into hydrogen and carbon dioxide using a specialised catalyst.

[5] https://theenergyst.com/hydrogen-itm-power-to-open-worlds-biggest-electrolyser-factory-in-sheffield/
[6] http://www.hydrogentaskforce.co.uk/wp-content/uploads/2020/03/Hydrogen-Taskforce-Report-Feb2020-website-FINAL.pdf

The cost of producing green and clean Hydrogen is often cited as a barrier to progress and there is a need for development of the infrastructure.[7]

Costs of hydrogen production (2018) International Energy Agency



It is worth noting that investment is required into each area to support the future production of Hydrogen, whether that be through the splitting of natural gas and supporting CCUS projects to become an industrial reality across the UK. In terms of Hydrogen from renewables, there needs to be investment in further electrolysers connected to renewable energy provision. This is why a joined up industrial strategy linking key sectoral workplaces to Hydrogen generation projects would be necessary for this fuel to become a key component of industrial developments to net zero and decarbonisation.

Examples of Hydrogen demonstration projects in the UK

HyNet, this project in the North West of England has been given government support to develop conversion processes to Hydrogen from natural gas at three sites.

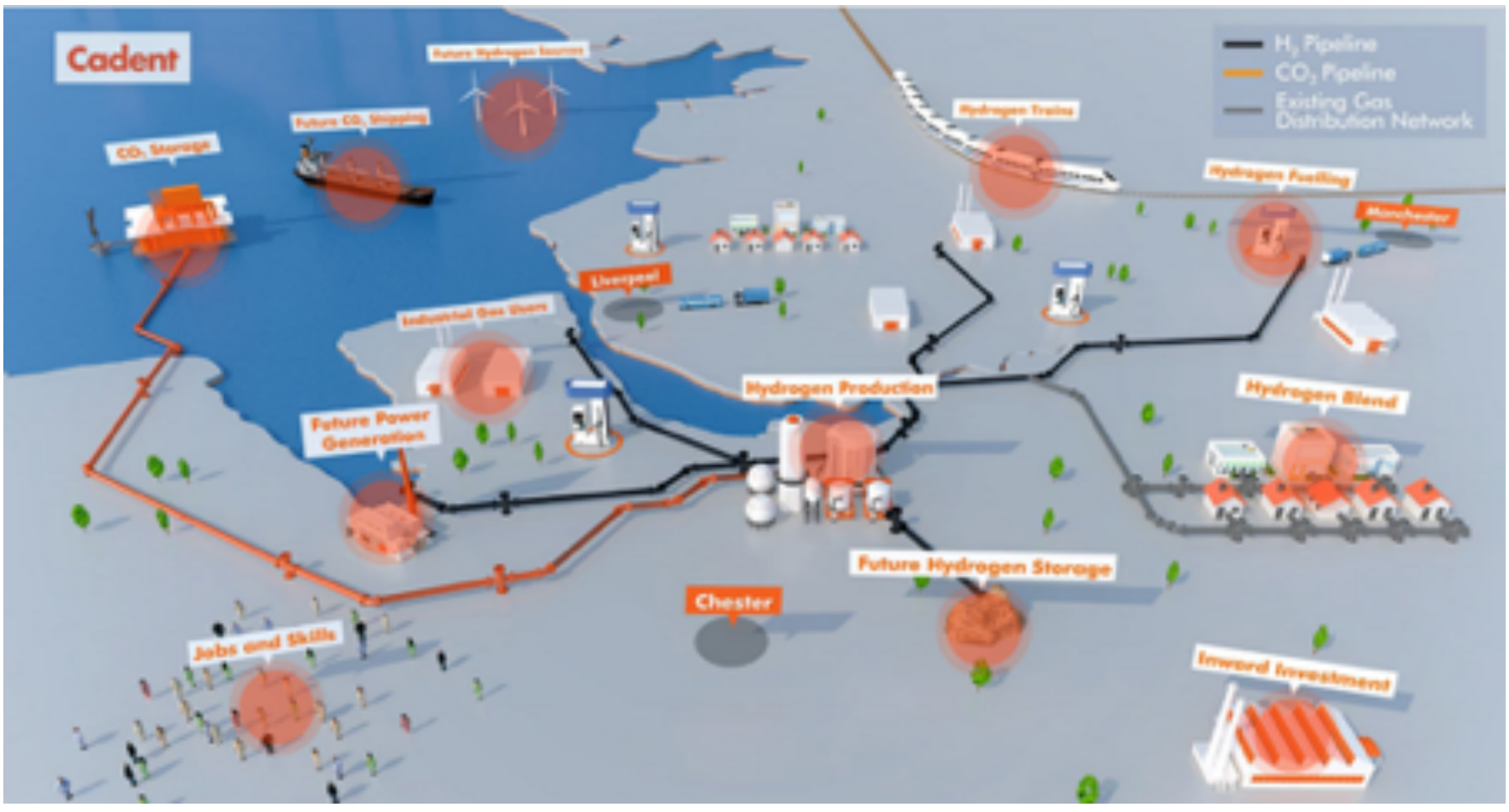
The consortium includes strategic CPPT companies Unilever, Pilkington and Essar has been awarded £5.3m of Government funding to undertake detailed design and practical demonstration of conversion of three sites from natural gas to hydrogen. It is expected that once the demonstrations are complete in spring 2021, these sites, and a range of others using very similar boilers, furnaces or gas turbines will have sufficient confidence to fully convert to low carbon hydrogen once it becomes available in bulk from the HyNet project.

[7] https://www.iea.org/data-and-statistics/charts/hydrogen-production-costs-by-production-source-2018

The HyNet project will include Carbon Capture Utilisation Storage facility that will be a vital component to ensure substantial decarbonisation in future. In order to produce blue hydrogen that contributes to the reduction in carbon emissions the carbon capture utilisation and storage system must be in place as part of any new energy or fuel production system involving carbon emitting products.[8]

Essar Oil UK, and Progressive Energy have announced plans to invest £750m to manufacture hydrogen at the refinery for use across the HyNet region to provide Essar Oil UK with low carbon hydrogen to decarbonise its own energy demand in addition to creating a hydrogen economy across North West England and North East Wales.

Natural gas, and fuel gases from the refinery, will be converted into low carbon hydrogen, with carbon dioxide captured and stored offshore in sub-surface reservoirs in Liverpool Bay.[9] (CCUS)



The Acorn project, located in Aberdeenshire close to the North Sea oil and gas infrastructure aims to develop the technology and processes to allow North Sea natural gas to be reformed into clean hydrogen. It is intended that CO2 emissions would be safely mitigated through the Acorn CCS infrastructure. Hydrogen would then be used in low carbon transport applications, and in the gas grid to decarbonise heating in our homes and industries.[10]

Case study: The Gigastack project

Gigastack is a demonstration project in the UK for industrial scale, low-cost renewable hydrogen production through the electrolysis process. The 100MW electrolyser system will be located at Humber refinery in North Lincolnshire on the northeast coast of the UK. It is spread over a 480 acre-site, and the refinery is located close to the Hornsea substation. The crude processing capacity of the Humber refinery is reported as 221,000 barrels per day (bpd).

The project is being undertaken by a consortium led by ITM Power, an electrolyser systems manufacturer based in Sheffield, UK, other partners are wind power producer Orsted, oil refining company Phillips 66, and low-carbon energy consultant Element Energy.

The design of a 5MW electrolyser stack was developed and an initial feasibility study was completed as part of phase one of the project in September 2019. The project advanced to phase two, securing funding from the UK Government in February 2020. Gigastack partners received £7.5m ($10m) funding from the Department for Business, Energy and Industrial Strategy (BEIS), Government of the UK, in February 2020. The project had also received a funding of £499,905 from the UK government for conducting a feasibility study during phase one in 2019.

[8] https://hynet.co.uk/
[9] https://www.essar.com/essar-and-progressive-energy-join-forces-to-deliver-the-uks-first-low-carbon-hydrogen-production-hub/
[10] https://www.essar.com/essar-and-progressive-energ

Gigastack project phase two details

A front-end engineering and design (FEED) study for the deployment of a 100MW electrolyser system at the Phillips 66-operated Humber refinery in North Lincolnshire will be conducted as part of the phase two development of the Gigastack pilot project. Apart from finalising manufacturing designs the company will also test its new generation of electrolyser stack technology for further cost reduction and improved efficiency. The Gigastack demonstration project at the Humber refinery is being undertaken to help identify regulatory, technical and commercial challenges involved in the industrial-scale application of renewable hydrogen systems.

With the increased use of Hydrogen representing one potential technological development that could see a switch from current fossil fuel industries to a low carbon future, a key component of that process will be the outcome for jobs and skills in local communities, and critically for our CPPT members, the impact on employment in this sector and sub-sectors. The creation of green Hydrogen from electrolysis is interwoven in the UK delivery and investment of renewables to support this process. This is where the UK should be in an economically advantageous situation due to the capacity for renewable energy solutions.[11]

UK Government Hydrogen Strategy

Prior to the 2019 general election the Conservative Party Manifesto[12] pledged to:
"Reaching Net Zero by 2050 with investment in clean energy solutions and green infrastructure to reduce carbon emissions and pollution."

Since then the UK government has established the Hydrogen Advisory Council. Membership of the council is made up of senior business leaders, academics and government representatives and is co-chaired by Minister of State for Business, Energy and Clean Growth Kwasi Kwarteng, and Sinead Lynch, Chair, Shell UK.

The council will be the primary vehicle for discussion between the Business, Energy and Industrial Strategy department concerning Hydrogen potential as a low carbon fuel for use across transport, industry and wider energy systems. The glaring omission from the council is any representation of workers interests through trade union membership.

In response to a question on the plans of the UK government to develop a strategy on Hydrogen, Minister Kwasi Kwarteng said:
"The Government is committed to the development of hydrogen as a strategic decarbonised energy carrier for the UK. We are currently developing our strategic approach to hydrogen and its potential to deliver against our net zero goals.

In order to inform our approach, we are undertaking extensive stakeholder engagement, including through the launch of our Hydrogen Advisory Council enabling government to work in partnership with industry, as we develop new policy to help bring forward the technologies and supply chain we will need to grow the UK hydrogen economy. This includes developing business models to support the deployment of, and investment in, low carbon hydrogen production and a £100m Low Carbon Hydrogen Production Fund to stimulate capital investment".[13]

In November 2020, the UK government published a "Ten Point Plan for a Green Industrial Revolution"[14] that identified the potential role of low carbon Hydrogen in the development of a net zero economy by 2050. This will include £500m of investment in new hydrogen technology with the aim of delivering 8000 jobs by 2030, and up to 100,000 jobs by 2050. In the UK government's Energy White Paper the development of a hydrogen economy appears as a priority area in support of a portfolio of solutions supporting a future net zero economy.[15]

The strategy includes a role for carbon capture and storage facilities as well as the utilisation of offshore wide and other renewable infrastructure to support the development of green hydrogen. The details of the job creation is largely missing and business models and ownership of the infrastructure required to deliver the low carbon Hydrogen has yet to be identified although the reference to developing £4bn of private sector investment by 2030 clearly visualises a role for major corporations.

[11] https://www.nsenergybusiness.com/projects/gigastack-renewable-hydrogen-project/
[12] https://www.conservatives.com/our-plan
[13] https://questions-statements.parliament.uk/written-questions/detail/2020-07-09/71898
[14] https://www.gov.uk/government/news/pm-outlines-his-ten-point-plan-for-a-green-industrial-revolution-for-250000-jobs
[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

The UK government target milestones are:

- 2021 Publish our Hydrogen Strategy and begin consultation on Government's preferred business models for hydrogen.
- 2022 Finalise hydrogen business models.
- 2023 Work with industry to complete testing necessary to allow up to 20% blending of hydrogen into the gas distribution grid for all homes on the gas grid.
- 2023 By 2023 we will support industry to begin hydrogen heating trials in a local neighbourhood.
- 2025 We hope to see 1 GW of Hydrogen production capacity.
- 2025 Will support industry to begin a large village hydrogen heating trial, and set out plans for a possible pilot hydrogen town before the end of the decade.

Jobs, Skills and Pay – A workers "Just Transition"

Just Transition as a concept is being developed globally in response to the urgent requirement to ensure a successful transition to a zero-carbon economy.

The London School of Economic and Political Science Grantham Research Institute on Climate Change and the Environment estimates that a fifth of current jobs (21%) in the UK have skills for which demand could grow in the green economy or could require reskilling – affecting more than six million people.

Research identifies around 10% of workers have skills that could be in more demand, while 10% are more likely to need reskilling – this does not necessarily mean these jobs will be lost. The work estimates that over 3 million jobs in the UK require reskilling to support the transition to net zero.

In terms of the geographical impact in the UK, the East Midlands, West Midlands, and Yorkshire and the Humber are the three regions with the highest proportions of jobs that could be exposed to the transition. In a 2019 policy brief on just transition across the UK the institute estimates that 17% of manufacturing jobs will require reskilling.

At the 2019 Labour Conference, Unite led demands for a Green New Deal and motions were adopted calling on the Party to "work towards a path to net zero carbon emissions by 2030" and "work towards a path of net zero carbon emissions within keeping of the IPCC advice including to keep global average temperature rises below 1.5C". Just Transition is at the heart of this approach. This means workers in key and impacted industries, including manufacturing, transport and energy, must all be directly involved and supported as the industries, workplaces and jobs transition.

In response to an all Unite reps coming out of Covid-19 survey in May 2020, when asked what should be in the Government's strategy for recovery after the crisis, there was overwhelming support among CPPT reps for:

- A new economy, underpinned by secure employment and decent pay and conditions.
- Putting workers and trade unions at the centre of a new economy, both in the workplace and society'; and
- A more environmentally sustainable economy.

Joint Trade Union response:

At the national level, the TUC has argued that the UK government needs a co-ordinated industrial strategy that includes the following elements:

- **An integrated energy policy with a long-term plan for how to reach net zero.**
- **Support for specific industries.**
- **Investment to support these priorities, with a clear focus on good jobs.**
- **An integrated skills policy.**
- **A Just Transition commission to ensure that workers' voice is central to guiding these policies.**

The concept of "Just transition", the necessary requirements to transform to a low carbon economy while ensuring workers and local communities are protected and sustained with jobs created and skills anticipation plans in place is vital to the transformation of high carbon usage industries. While the "just transition" concept remains the subject of different strategies across the global trade union movement; representatives of four major UK trade unions (Unite, Unison, GMB, Prospect) agreed a 10 point plan in Autumn 2018 which included:

Training and skills development:
Workers affected have fully funded access to quality training and skills development to support them through any adaptations required, or to take up new opportunities.

Relocation is fully-funded and voluntary:
Workers have access to jobs in other geographic locations with fully-funded relocation packages agreed with trade unions and worker take-up of these opportunities is voluntary.

Adapting to the reality of climate change:
Energy workers have the insight and skills to provide a unique viewpoint on not just the challenges of climate change, but also the complexity of solutions required to tackle it.

New jobs with comparable terms and conditions:
We need a focus on the quality of jobs needed for a low-carbon economy. Too often the quality of work is an afterthought. New jobs need to be equivalent in skills, conditions and pensions. This means giving workers a voice and recognition of unions.

Secure supply of affordable energy:
It is essential that energy supply is secure, reliable, works in the interests of the nation and is affordable to all consumers with costs shared on an able to pay basis.

Influence and a voice over future policy:
Unions and workers affected demand a seat at the table at which key decisions are taken on the transition. They should be able to contribute to solutions not simply told after the decision is made.

Taking a long term and sustainable view:
We need a long-term plan with decisions taken to secure a long-term future for all, not one simply based on continued short-term profits or convenience. If workers are to be affected by transition it must be for worthwhile reasons and deliver long term rewards.

Industrially focused and supporting a balanced energy policy:
Decisions taken need to ensure the UK remains a competitive employer with a strong manufacturing base (not exporting carbon intensive jobs overseas) and a balanced energy policy which builds on existing strengths and current infrastructure to address climate change.

Oversight and ownership energy policy must serve the public good:
We need oversight of the transition policies and a full review of the ownership status of energy assets in the UK.

No communities left behind:
We must recognise and react to the impact that closing carbon intensive production brings to local communities and invest in them to bring about long term renewal.

In the current context where support for both existing jobs and creation of future green jobs is crucial to economic success and sustainability of our economy much therefore depends on how a just transition is approached in an industrial sense. Who are the agents or drivers of change, and in what sense transformation is 'just'; trade unions may take different pathways, while all striving for a 'just' transition.

As a result, the notion can become multi-faceted and blurred, even attracting critics when it is aligned not so much with a transformation but rather a smooth transition, aided by technology and the free market.

A key point is in the way in which the transformation of our economy from dependence on carbon emitting fuels to net zero is developed and critically the impact on workers and communities from the necessary economic and industrial change.

As Frank Hoffer of Action, Collaboration, Transformation (ACT)[16] wrote:

> ***"The narrative of 'green growth' and just transition is basically a variation of the Keynesian compromise of market-driven innovation combined with social-democratic industrial restructuring. It assumes that through technological progress plus government policies the circle can be squared: energy- and resource-saving innovation allow simultaneously improved material wellbeing, reduced resource utilisation and lower CO2 emissions. We can enjoy no illusion that a global economy based on permanent growth and powered by the pursue of profit maximisation is environmentally sustainable. It is not." (Hoffer, 2020: 38–39, 41)***

This puts sharp focus on the debate about the transformation of our economy while ensuring that good jobs, skills and pay is protected and then harnessed into developing sectors of the economy that will be required in order to deliver on net zero targets set out in legislation.

This is a key point:

What is being done now to secure a positive future for workers in affected industries and the economic development of that industrial landscape?

Just Transition has to be developed through worker participation with trade unions and the involvement in decision making of local communities. Workers must be architects of transformation, we cannot be seen as mere bystanders in the transformation process towards a low carbon net zero economy. It cannot simply be left to government or employer interests to dictate how a future net zero economy is developed within our key sectors such as oil and gas, refining, chemicals, pharmaceuticals and glass.

The interests of affected workers has to be front and centre of policy actions taken to achieve decarbonisation. Our members in high carbon emitting industries are rightly asking:

What are these green jobs that we will transition to?

What skills will be required, and what skills will be no longer needed?

Where is the transition skills training and support?

How will our existing pay and terms and conditions be protected?

This is obviously hugely important for high carbon industrial clusters and communities, such as our members in the oil and gas refinery sector, and in chemicals, where change could be significant.

Skills anticipation and job sustainability is therefore central to ensuring that workers are upskilled as jobs change, and that in any redeployment of the workforce each and every worker has an opportunity to transfer to equivalent skilled jobs. This also includes repurposing existing skills for use into new industries. Building this approach into the plan must also strengthen workers' voice with trade unions engaged in long-term planning.

This should involve plans for creating agreements drawn up by workers, unions and employers to meet decarbonisation targets on a tripartite basis. These should be consistent and integrated across sectors. Options for public and community ownership or partial stakes in flagship projects and enterprises should be pursued. Political commitment is required to exercise all levers available to secure employment and social benefits across the UK, particularly in industrial cluster areas that stand to be most impacted by the reduction in fossil fuel, high carbon industries.

Regional hubs for decarbonisation with skills anticipation strategies and meeting the challenges of providing skilled jobs in these communities will be vital. Action must include the creation of local supply chains, community benefit clauses, local content clauses and local ownership, including incorporating this into licensing, planning and funding processes.

Any impacted job has to be supported by a reskilling policy that provides transferable skills and ensures sustainable employment into the sectors of the economy being supported by the development of technological decarbonisation processes at plants, and refineries across the UK. Equally, Unite demands each individual sub-sector commits to engaging workers in the decarbonisation process, developing required skills and investing in a sustainable employment market that protects jobs and local communities.

[16] https://westminsterresearch.westminster.ac.uk/download/4600043900b4dc5b8070dda6661766ffd0b8f2d5d4077973868e07c5cba6406c/161822/Clarke%20and%20Lipsig%20Mumme%20Introduction%20v2%20untracked.pdf

A Just Transition requires that sufficient new, good quality jobs are created to replace any lost through action to tackle emissions. That means ensuring that domestic manufacturing capacity evolves to create supply chains for major new energy generation and other large infrastructure projects. To avoid offshoring of jobs, and a loss of income for the economy, government must use all available levers to ensure that each contract delivers a minimum share of work to local suppliers, including incorporating this into licensing and funding processes.

All levels of government must work together with employers and unions to develop skills planning policies that anticipates industrial transformation, accounting for existing skills in the UK workforce, those required in the shape of a future economy and plans to provide retraining or skills development to ensure adequate lead in time.

There is a real danger that a Just Transition will be jeopardised by shortfalls in the ability of workers with the right skills. Innovative government thinking to maintain the UK skills knowledge base of workers would see workers in industries impacted by the Covid-19 pandemic supported financially to retrain and develop the specific skills necessary to support the development of net zero transformation.

Projection of demand for skills and labour must be an essential part of this. Strategies should also be used to ensure that a Just Transition is complemented by provision of training and education required for continued skilled employment. Wide-scale planning is especially relevant where time will be needed for workers to gain appropriate qualifications.

Investment to upskill workers should be funded collectively by employers, with costs shared according to number employed, including those employed as contractors. Where employers may not have capacity to support sufficient training in new occupations, the government should support and subsidise employers. Sufficient additional resources should be put into the apprenticeship system to encourage take-up of apprenticeships.

Oil and Gas Sector

The offshore oil and gas sector is in the midst of a crisis. Unite alongside sister trade unions that make up the Offshore Coordinating Group released the report "A crisis within a crisis", highlighting the immediacy of the challenge in the sector, citing the possibility of 3,500 workers gone from the sector by September. This estimate appears conservative following the Oil and Gas Workforce Insight report 2020 that raised the prospect that up to 8000 jobs in the sector may have already perished. This is nothing short of an unmitigated disaster.[17] The Scottish and UK Government should have stepped in and taken a public stake in the sector to protect jobs. In a country that purports to lead a green new deal and a renewables revolution, the concept of Just Transition will ring hollow to those workers that have been cast aside; underlining the urgency in developing a strategic jobs based approach to the transformation to a low carbon economic future.

It is unclear whether the level of investment in decarbonisation pathways by major oil and gas companies will align their business models to the 2050 climate change ambitions set out in Paris.[18] An example of the transitional model was developed by Orsted energy. Previously involved in the oil and gas sector the company has developed a new vision: to create a world that runs entirely on green energy.[19]

Transition must include ensuring workers can easily transfer to the new green jobs. Retraining, upskilling and redeployment should have ensured that transition for offshore workers. Political will and support for industries across the UK interconnected to our offshore industry should have seen a high level of employment sustained.

[17] https://oilandgasuk.co.uk/product/workforce-report/
[18] https://www.rechargenews.com/transition/big-oil-decarbonisation-plans-insufficient-to-avert-dangerous-climate-change/2-1-889306
[19] https://www.london.edu/think/iie-from-fossil-fuels-to-green-energy-the-orsted-story
[20] https://www.ukpia.com/media-centre/news/2020/a-transition-transformation-and-innovation-towards-net-zero-in-uk-downstream/

Downstream oil sector

The UK Petroleum Industry Association (UKPIA) report "Transition, Transformation and Innovation" identifies on the role of the downstream oil sector in the challenges of delivering a net zero economy.[20] The key points from the report are:

- Low carbon fuels can play a key role in the UK's decarbonisation strategy and are doing so already.
- Needs a system based approach and enabling policy framework. (Premised on support for business investment and exploration).
- Sees Hydrogen as a critical component as a low carbon liquid fuel to support the establishment of a net zero economy in the UK.

Policy asks from UK PIA Transformation report

- Government stimulates demand for Low Carbon Liquid Fuels (LCLF).
- Necessary to inform consumers about the role of LCLF in decarbonisation strategies.
- Revise CO2 standards and emissions labels – to show lifecycle emissions.
- Government and industry develop sector specific plans to decarbonize sectors with limited decarbonisation options (e.g. Aviation).
- Deliver a hydrogen strategy that sets out policy, regulation, and sets out preferred business framework needs.
- Improve business environment: position UK as first choice and enable UK companies to compete globally.
- Promote industrial centers with downstream oil sector at the center.
- Prepare workforce to deliver "net zero" in a Just Transition.
- Government support for technological advances, research and development and deployment of all manufacturing and transport decarbonisation aligns with company needs.
- Deliver a regulatory framework that allows for innovation .

The report recommendations are worth consideration by Unite members across the downstream oil sector. When the report identifies the need to "prepare the workforce", it is in the context of six UK refineries currently representing around 12% of European refining capacity.

The UK PIA report highlights the need for a comprehensive and economy-wide policy that will incentivize decarbonisation and that without this it will be difficult to decarbonise at scale. Unite's policy is that any decarbonisation process and policy must support a public stake in the resources required. For example, if Carbon Capture Utilisation and Storage processes are built to support the development of hydrogen by splitting natural gas, then the state should have a role to play in these projects and the Treasury receive receipts from users that can be used to support investment in public services.

The Chemical Industry

The UK chemical sector is a supplier to a range of UK industry. Aerospace, automotive, construction, pharmaceuticals and direct consumers are all dependent on supply from a range of chemical products and chemical companies. In the UK there are around 75 major players in the sector, all with over 250 employees and supported within the industrial supply chain by over 2,500 small to medium sized enterprises.[21] The sector has major influence on employment and skills around certain clusters in the UK; the North East, North West, Humberside, Teesside and Scotland (Grangemouth).

Chemicals play a significant role in the UK manufactured exports accounting for around 9% of all UK exports. The need for the sector to remain globally competitive while implementing the transformational processes required to decarbonise the sector cannot be overstated.

[21] https://www.parliament.uk/globalassets/documents/commons-committees/Exiting-the-European-Union/17-19/Sectoral-Analyses/7-Sectoral-Analyses-Chemicals-Report.pdf

The sector is highly dependent upon thermos-energy processes, and therefore is a high energy user, in order to achieve necessary chemical reactions to support the creation and manufacture of chemical products. The sector has worked jointly with government to develop the Joint Industry Decarbonisation and Energy Efficiency Roadmap Action Plan in 2017. The challenge for the chemical industry was framed in the context of attempting to deliver a 50% increase in contribution to the UK economy by 2030, while implementing reduction in carbon emissions and supporting increased energy efficiency. The sector roadmap set out that nine processes involving major chemical sector employers were found to be responsible for 54% of chemical sector emissions. These included large companies where Unite is organised and within the chemical hub clusters in the UK. Decarbonisation of these plants will undoubtedly have an effect on those jobs, whether that be in the skills required going forward change and the potential for new green job creation.

The 2017 Action Plan report highlights the need for the sector to be working within a predictable policy framework, with the necessity for help to reduce carbon emissions through established or new technologies. Clean Hydrogen generation and carbon capture utilisation and storage are two of the potential processes by which this ambition could be delivered.

The Chemical Industries Association (CIA) has developed its policy around wider decarbonisation strategies including the potential influence of Hydrogen in our economy. In response to government departmental consultation the CIA have identified some key messages around Hydrogen:

1. **Hydrogen could play a pivotal role in eliminating the carbon footprint of energy and feedstock in the chemical sector.**
2. **The cost of hydrogen, as well as the energy-intensity of the industrial process and its exposure to international competition, will ultimately dictate whether UK industry can use hydrogen to reach net zero.**
3. **To establish a successful hydrogen economy, the UK needs a long-term and flexible strategy that establishes the conditions needed to invest.**

Unite members in the chemical sector are committed to securing futures for workers and thus ensuring a collective response to support investment in their futures and that of their communities. On the potential to embed hydrogen in industrial processes, a Unite chemicals workplace representative said:

> ***"My view is that in the medium/long term, to use hydrogen for things like peaking demand gas power stations (for times when there is peak demand, or the wind isn't blowing enough). You make the hydrogen by electrolysis. You get the energy for electrolysis from overbuilding wind, using the excess power for electrolysis.***
>
> ***You can then either use hydrogen directly in the gas power station (which would need to be modified/rebuilt), or combine hydrogen with either sequestered carbon from an industrial process (eg cement), or directly capture carbon from the air, and combine it with hydrogen to make methane. This methane would be net zero carbon, as you've made the hydrogen from electrolysis and reused carbon from the air."***

In terms of public/community ownership opportunities:

> ***"If a local authority has partial ownership of a windfarm, any excess generation is used to power an electrolyser. The hydrogen is then used as either a material to make fuel for shipping or power generation, or as a replacement material for manufacturing.***
>
> ***That creates local jobs, and puts at least some ownership back to people and communities, rather than leaving it in the hands of big companies."***

[21] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652080/glass-decarbonisation-action-plan.pdf

The Glass Sector

The UK glass industry contributes £150bn to the UK economy in GVA. Across the UK glass manufacturing directly supports over 6000 jobs.[22]

The glass industry source of industrial CO2 emissions is through the combustion of fossil fuels for heat and process emissions from other chemical used in the manufacturing process (e.g. cement, ammonia, iron). Indirect emissions come from other fuel uses in the industrial process.

Alternative fuel switching, including developing Hydrogen based solution is being considered as part of the development of net zero in the glass sector. The industry has identified a scope of economic modelling that will consider the costs and outcomes associated with potential decarbonisation technology, this will include:

- Furnace Costs.
- Site Costs.
- Fuel Costs.
- Electricity connection costs.

The view from the glass sector is that the industry is well placed to develop carbon neutral processes. NSG Group has committed to reduce its direct and indirect emissions levels by 21% by 2030. Alternative fuel switching and developing technological advances, either through renewable electricity or CCUS can play a major role in this development with Hydrogen generation being considered as a serious option to achieve net zero goals.

Unite is well represented within the glass sector. Organised sites cluster primarily around the North West, with other sizeable companies in operation throughout the UK. Unite members are obviously concerned that the decarbonisation process in the industry maintain the competitiveness of the UK plants so that skilled, well paid jobs, and opportunities for apprenticeships, support employment and skills across areas reliant on the sector, and provide much needed sustainable employment.

International examples

KOREA

South Korea is seen as one of the global front runners in Hydrogen generation. In June 2018, the Ministry of Trade Industry and Energy (MOTIE) announced a 2.6 trillion South Korean Won (KRW) (about 22 billion United States dollars - USD) budget for the establishment of a public-private H2 vehicle industry ecosystem by 2022. In 2019, the government released the "Hydrogen Economy Roadmap of Korea" and the "National Roadmap of Hydrogen Technology Development", setting long term targets through 2040.[23]

The hydrogen strategy is primarily driven by economic growth and industrial competitiveness ambitions and to a lesser degree, by environmental concerns. South Korea's strategy at this stage is not as climate-friendly as other countries, it implies a scale up of carbon intensive hydrogen produced from petrochemical plants or natural gas reforming without carbon capture and storage (CCS). This contrasts with many European countries, where the promotion of clean hydrogen is to enable green decarbonisation.

South Korea is preparing to import hydrogen to support its economic ambitions. South Korea and Norway announced cooperation on shipbuilding for liquefied hydrogen transportation in June 2019. Daewoo Shipbuilding and Marine Engineering is studying the possibility of using ammonia as ship fuel. H2KOREA, a private-government body connecting central government and local government with private companies, signed a memorandum with the Australian Hydrogen Council.

GERMANY

The German government has unveiled a financial strategy that includes support for Green hydrogen. In June 2020, as part of the overall decarbonisation strategy financial investment in Hydrogen is included as a key part of Germany's energy transition (Energiewende) strategy to become carbon neutral by 2050. The plan, which could see hydrogen eventually make up about 10% of the country's total electricity capacity, was unveiled as part of a €130 billion stimulus to help reboot the economy during the coronavirus pandemic. The hydrogen commitment is part of some €40 billion earmarked for climate-related spending.[24]

[23] https://www.rvo.nl/sites/default/files/2019/03/Hydrogen-economy-plan-in-Korea.pdf
[24] https:// www.dw.com/en/germany-and-hydrogen-9-billion-to-spend-as-strategy-is-revealed/a-53719746

The German Economy Minister said the plan was to use green hydrogen where it mattered most and where it was bound to have the biggest impact. The priority is to decarbonise industrial processes, and understanding in particular the need for Germany to produce climate-neutral steel.

Korea and Germany are two examples of countries taking different routes on hydrogen and decarbonisation. What our paper has sought to identify is that there is a requirement for trade union engagement in any future strategy to decarbonise CPPT sectors and that workers need to play a key role in shaping the future of work and quality jobs. This must take place at national, sector and regional level.

Research supporting the 2018 European Trade Union Confederation guide – "Involving Trade Unions in Climate Action to build a Just Transition" identified that up to half of trade unions had not been consulted on sectoral decarbonisation strategies, but over 75% were consulted in long term decarbonisation strategies for 2050. The UK is one state where this level of engagement has not taken place. By comparison in France, unions are a key stakeholder in the National Council for Ecological Transition alongside employers, experts, regional authorities, and involved in the draft energy and environmental legislation.

Tony Devlin National Officer, Chemicals, Pharmaceuticals, Process and Textiles

It is clear that workers, industries, and the UK economy are at the starting grid of delivering a sustainable life changing green economy that supports well paid skilled jobs, industries, communities and society for decades to come. To achieve this workers must be a part of this journey from the start to create a full understanding of the challenges and opportunities that exist and lie ahead to allow workers and industries to make informed sustainable decisions that maximize the many and exciting opportunities that must be embraced for the benefit of all.

The UK government and industry must not charge ahead without workers as they seek to address the challenges of meeting the various Net Zero targets and decarbonisation. They must create a dedicated fully funded department of government whose sole focus is on a green economy and a Just Transition in, and for the UK, as well as a Just Transition Commission that includes trade unions and coordinates the wide and varied Net Zero strategies and deadlines in the UK to ensure that we continue to lead global industry and resist offshoring or a decline in skills and excellence that UK workers provide.

A Just Transition towards a green economy is not a short term project that will be resolved with a short term fix; it is fundamental lifestyle change for the UK and global population. This will require education to play a significant role, a transition to a green economy is a generational challenge where current and future generations will hand over the baton for each other to take forward. Responsibility lies on all of our shoulders as workers, their unions, industry and the UK government to ensure that we get it right at the start and establish solid inclusive collaborative foundations that not only meet these challenges, but excel, and ensure that UK workers and industry leads the way globally in a "Workers Transition" ensuring that the decisions we make today deliver social and economic benefits in the future.

Unite CPPT Key demands:

- A government led industrial strategy for the CPPT sector where jobs and communities are protected and supported by public investment and ownership, including a transition commission where workers' voice is represented.
- A dedicated, fully funded department of government whose sole focus is on a green economy and a Just Transition in, and for the UK.
- Trade Union engagement and involvement at national, regional and sectoral level to support industrial strategies to deliver a just transition for workers.
- Public policy and investment to secure a positive future for workers in effected industries and communities with targeted economic investment in industry cluster areas.
- Identification and strategic planning to support green jobs that workers in affected industries will transition into.
- A skills transition policy with job and income protection for workers while developing any new and necessary skills.
- Supportive industrial relations landscape with access to workplaces for trade unions supporting fair work and good quality jobs .

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