The Sector Skills Council for
Chemicals, Nuclear, Oil and Gas,
Petroleum and Polymers

A Skills Needs Assessment of the **Chemical Industry**

Working to assess and quantify the skills challenges facing the UK chemicals industry through its Sector Skills Agreement Process (SSA). This document is a summary of Stage One of this five stage process.

Innovation — Competence — Productivity — Sustainability

Improving *business performance through* ***skills*** *development*

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INTRODUCTION

This document is an Executive Summary of the Skills Need Assessment, (SNA), for the Chemicals industry, the first phase of the Sector Skills Agreement, (SSA), which culminates in the development of an industry action plan.

The realities of global competition have focussed even greater attention on UK productivity and the gap between the UK and France, Germany and the United States. The Treasury has stated that if the UK were to match the productivity performance of the US, for example, output per head would be over £6,000 higher.

Workforce development is central to this agenda and over the past decade workforce skills have become a government strategic priority – in terms of funding, qualifications and provision. The availability of skilled employees is now recognised as fundamental to productivity and economic success by policy makers and employers alike.

THE SECTOR SKILLS AGREEMENT PROCESS

Sector Skills Agreements are being produced for every sector which is supported by a Sector Skills Council. The aim of these agreements is to secure for each sector the range and level of skills necessary to achieve productivity at internationally competitive levels. In partnership with employers, the Agreement will:

- lead to better planned and more integrated delivery of skills training;
- help to produce credible, cost effective, quality assured and better-tailored training provision;
- help to target public funding more efficiently;
- encourage employers to invest more in developing their workforce.

CHEMICAL INDUSTRY COVERAGE

The chemical industry covers:

- manufacture of chemicals;
- manufacturing of consumer products, such as cosmetics and detergents;
- manufacture of active ingredients for the pharmaceutical industry.

The Chemicals industry strategic objectives are to:

- Drive up productivity and performance and move higher up the international productivity league table;
- Harness innovation to meet new customer expectations;
- Continued globalisation;
- Move away from commodity and bulk manufacture towards niche markets and specialisation;
- Become sustainable.

Industry	Number of Employers	Number of Employees	
		Industry Estimate	ABI+
Chemicals	3,900	170,000	186,976
Oil and Gas	440	185,000	25,661
Nuclear	200	56,000	13,413
Petroleum*	7,400	123,000	63,757
Polymer	7,500	286,000	196,650
Cogent	**19,500**	**820,000**	**486,457**

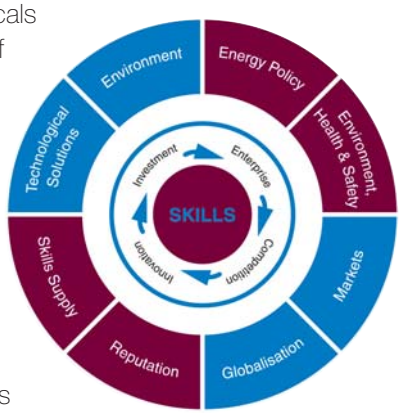
*Petroleum industry also includes forecourt retail. Oil and gas and nuclear industry estimates include direct and indirect employment

COMPETITIVE POSITION

Markets

Chemicals is one of the most globalised manufacturing industries, and the trend continues. The impact of globalisation is that organisations are working continually to improve efficiency, reduce waste and cut costs. Both speciality and bulk chemicals producers currently find a cost advantage in basing operations overseas in the Third World and the Middle East.

The recent massive growth in the Chinese market - which their own chemicals industry is not currently able to meet – is a major new opportunity. Imports of speciality chemicals to China are growing at a rate of 31% per year. Despite this, overall UK Chemical manufacturing investment has been in decline since 1998.



Competitiveness of the Cogent Sector

Cogent sector employer confidence is lower than across UK industry as a whole. In these conditions chemicals companies are more likely to be focussing on developing new products and services than UK employers as a whole. As a result, many companies are moving away from bulk/commodity chemicals, to higher added value chemicals, which could lead to UK manufacturers losing their bulk/commodity markets and may result in companies operating on a smaller scale within niche markets.

Government

A key business driver for the Chemicals industry is environmental, health and safety regulations. Over recent years EU directives, regulations and legislation have placed significant additional burdens on employers in the UK.

The 2001 White Paper 'Strategy for a Future Chemicals Policy' addressed the perceived shortcomings of the current system. This introduced a new system of chemicals control called REACH – Registration, Evaluation and Authorisation of Chemicals which is working its way through the EU approval process.

"60% of businesses reported that they were either implementing or planning to implement a move to a higher quality product, service or process area."

The Climate Change Levy came into force in April 2001, and represented a new energy tax within the business sector. Information from companies shows at best they will only recoup one fifth of this taxation. This will have an associated negative impact on the UK manufacturing base, in particular the Chemicals industry.

The UK is forecast to remain self sufficient for oil supply until 2009 but is already a net importer of gas. To maintain energy supply the UK will be increasingly dependent upon other countries and the developing infrastructure of oil and gas. High energy costs will remain an ongoing concern for chemical companies.

EMERGING ISSUES FROM THE SKILLS NEED ASSESSMENT

Productivity and sustainability of the Cogent industries is dependant upon the availability of a suitably skilled, trained and qualified workforce. The chemical sector needs highly skilled people who are able to contribute, innovate and take organisations beyond their current ambitions and to support corporate goals in what is an increasingly aggressive global market place.

As part of the SNA Cogent undertook extensive research and conducted 110 face-to-face employer interviews across its footprint. The results of this survey can be split across four strategic themes identifying, where the Chemicals industry needs to take action in the short, medium and longer term. Innovation: Management and Leadership: The Skills Gap: Workforce Demand and Industry Attraction.

	Chemicals %	Nuclear %	Oil & Gas %	Petroleum %	Polymers %
Managers & Senior Officials	22	4	16	23	16
Professionals	16	38	21	16	4
Associate Professional & Technical	17	13	21	20	7
Administration	9	11	9	11	9
Skilled Trades	4	24	16	7	17
Sales and Customer Services	2	0	0	2	2
Process & Machine Operatives	16	5	14	14	33
Elementary Occupations	13	5	3	6	10

*Labour Force Survey (q1 2004 – q4 2004). Nuclear & Radiological Skills Study (2002)

1. Innovation

We know that innovation is fundamental to the sustainability of this industry – and employers tell us it is a top priority. They recognise that competing on cost alone will no longer guarantee a sustainable future – meeting and anticipating the demand for new and speciality products is now critical to the overall long term success of the UK Chemicals industry. In addition, for commodity manufacturing to remain a viable business in the UK, continued attention to product and process improvement through innovation is key to the sustainability of this sub-industry.

Innovation in process and quality improvement is needed to improve business and manufacturing processes – including lean manufacturing – to meet customer requirements on time and on cost. Improvements in process efficiency will also reduce energy and materials demand. Continued operational improvement will mean further industry consolidation in order to reduce operating costs and improve profitability.

Product innovation requires further research and development to develop domestic strengths into commercial opportunities and to meet demands of growth industries for example imaging and displays, micropatterning, fuel cells and microfluidics. In addition the sector will see the scaling up of new and existing activities to enable commercial and responsive manufacture (for example industrial bio-processing).

Product improvements will also require greater integration of chemistry with other science and engineering disciplines and skill sets to improve innovative working. The Chemicals industry will also see an increased focus on high value added product Research and Development via University spin-outs. Significant research is being focussed on colloid and interfacial sciences - key for coatings, adhesives and consumer products markets. This technology will also be used in development of fuels, lubrication and environmental improvement.

2. Management & Leadership

Employers report skills gaps among managers and leaders including business acumen and effective management skills – particularly in people management, change management and personal development. Both now and in the future managers need to be able to achieve workforce improvements in performance, productivity, process and quality.

A step change in management and leadership is critical in turning the industry's strategic objectives into a practical reality and for delivering on the skills issues set out in each of the four strategic themes identified here. Critical areas for management development are:

- Management of change;
- Business and Financial Management;
- Business Improvement Techniques;
- Management of Safety, Regulatory, Legislative requirements

For organisations to succeed, leadership is needed at every level. Individuals need to be able to connect their personal visions to those of the organisation, creating the conditions in which their organisation can achieve success.

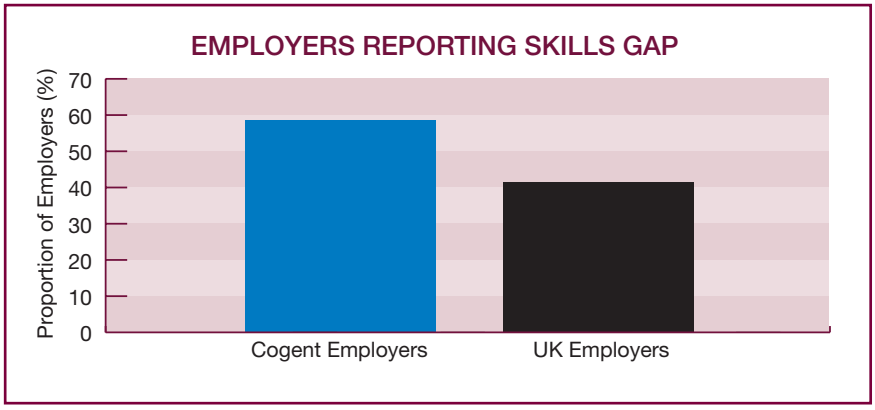
Companies higher up the value chain are much more reliant on the skills and the contribution of the people who work for them. It is their human capital, allied to the leadership capability within the organisation, which represents the primary source of competitive advantage.

Our assessment estimates a total workforce requirement across whole Cogent sector (not just chemicals) of approximately 24,000 people within this management occupational group over the next ten years.

3. The Skills Gap

Performance improvement is the immediate challenge for the Chemicals industry, with employers reporting that skill gaps (where employees do not have the level of skills required to be fully proficient in their current job role) among Process and Plant Operatives are more of an issue than actual skill shortages (vacancies that are hard to fill because applicants do not have the right skills, qualifications, know-how or experience to fill the job role) - particularly in small-medium sized companies. Upskilling is a particularly pressing issue for the industry as 75 per cent of today's employees will still be employed in 2020. Development of the current workforce is therefore a strategic priority.

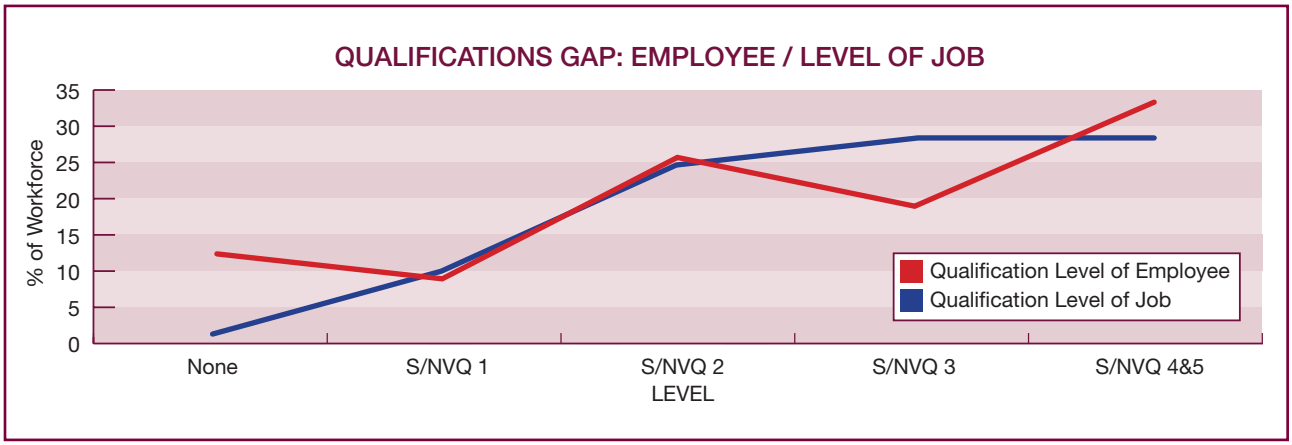
Our survey shows that overall skill gaps are a greater issue for employers in the Cogent sector than the economy as a whole.



National Employer Skills Surveys 2004/2005

"38% of employers reported that their existing workforce only partly possesses, or did not have the skills and knowledge required to meet the move to value-added"

This is a particular issue within Process and Plant Operative occupations as our assessment shows that over thirty per cent of employees in this group are doing jobs which need a Level 3 qualification, but less than twenty per cent of this population possess such a qualification.



Source: Labour Force Survey 2004

In addition, a number of pressing skills gaps have been identified across the Process Operative and Technician workforce including:

- legislative and behavioural aspects of SHE;
- first line maintenance for operators;
- basic and specialist IT applications.
- basic chemistry for understanding processes;
- lean manufacture and continuous improvement;
- rapid manufacture techniques.

4. Workforce Demand and Industry Attraction

Demand

As a result of various factors, over the next ten years the Cogent sector workforce requirement is anticipated to reduce by approximately 18,000 to a net demand of 101,000. However, the replacement demand - which takes account of the age profile of the incumbent workforce - shows that the volume of retirements and other leavers from the industry will outstrip the reduction in overall demand.

Over the next ten years the estimated total workforce requirement for Process and Plant Operatives across whole Cogent sector (not just the chemical industry) is approximately 24,000 people.

The anticipated volume of replacement demand means that the industry needs not only to recruit new starters near the beginning of their working lives, but also mature entrants in the form of industry experienced personnel to maintain the levels of workforce required in this occupational group.

The industry also requires new graduates, particularly in Chemical Engineering, Process Engineering and Chemistry: there is a projected net replacement demand of approximately 6,000 science, engineering and technical professionals and 5,000 associate professionals, for the sector.

However, this is only one aspect of graduate replenishment: as clearly many in this population move into management roles, which means there is an even greater need for the industry to attract and recruit high numbers of science graduates to provide ongoing industry leadership. Graduate recruitment remains a challenge given the fact that many industries and sectors are targeting these individuals.

PROJECTED NET REQUIREMENT ACROSS THE COGENT SECTOR CORE WORKFORCE, 2004-2014

(000s)	2004 Employment Level	Expansion Demand	Replacement Demand	Net Requirement
Corporate Managers including: Production Managers, Maintenance Managers Research & Development Managers, Site Managers	66	2	22	24
Science & Technology Professionals including: Chemists, Physicists, Mechanical Engineers, Electrical Engineers Chemical Engineers, Design & Development Engineers, Production & Process Engineers	24	-1	7	6
Science & Technology Associate Professionals including: Laboratory Technicians, Electrical/Electronics Technicians, Engineering Technicians, Building & Civil Engineering Technicians, Quality Assurance Technicians, Draughtspersons (usually hold HNC or HND)	18	-1	5	5
Process Plant & Mach Operatives including: Process Operator, Plant Operator, Field Operator	119	-18	43	24
Skilled Trades including: Electricians, Electrical Fitters, Machine Setters, Riggers & Welders (tend to have followed craft apprenticeship route)	34	-11	11	-1

Table based on data from Working Futures 2, 2004-2014 (IER). Nb. – Five core Cogent occupations have been selected.

Attraction

Recruitment across the main occupations is set to continue, with the industry facing a number of challenges to prevent ongoing difficulties. There is a need to ensure both young people and those mid-career are aware of the Chemicals industry and the career opportunities on offer to them.

We know that the Cogent sector has an ageing workforce, with fewer young people opting for a career in scientific disciplines. Fewer than 4 per cent of process operators are under 25, and 23 per cent are over 50.

"40% of employers believed that they would be increasing the level of entry requirements / qualification"

Our research also shows that the number of young people studying science at GCSE has remained static in recent years and the industry needs to ensure continued emphasis upon encouraging young people to study sciences, engineering and technical subjects at school, college and university.

When compared to the UK as a whole, there is under-representation by women in most areas of the Cogent sector, and considerable under-representation by minority ethnic groups. Improving the numbers of females and ethnic minorities entering the industry – particularly in science, engineering and technical job roles, will remain an ongoing imperative for the sector. This under-representation has its roots in the education system, as it is here that young women and minority ethnics are influenced and make decisions about which subjects to study. White males are much more likely to pursue scientific disciplines and move into technical roles through a variety of educational routes.

These factors combined mean that the industry needs to continue to attract a diverse workforce, in relation to age, gender and ethnicity. Such an approach means both a larger recruitment pool as well as the recruitment of talent from right across society.

Supply Chain

Finally, the industry also relies upon a contractor workforce for ongoing repair and maintenance as well as project work and site shutdowns. In the case of larger employers, there are often long term maintenance contracts in place with supporting companies, providing a level of stability in the employment base and an incentive to invest in skills development of contractors. However, skills shortages are also being experienced by contractors. So while the industry may not be experiencing these shortfalls directly, the situation with the contractor supply chain exacerbates problems over skills supply.

Ongoing sporadic need for contractor support and a number of large scale projects focused on annual shutdowns of complex plants for major scheduled maintenance all compound the skills supply problem.

There is a tremendous demand on the same contractor companies. There is evidence of co-operation within industries to ensure that demands are evenly spaced and to ensure equal access to preferred suppliers and associated skills. However this co-operation does not necessarily extend to other industries outside the Cogent footprint who use contractors, once again limiting the availability of suitably skilled personnel.

In addition to this, there is evidence that employers are not necessarily accessing appropriately skilled contractor personnel on occasion, leading to delays to essential work programmes. These factors too can only exacerbate the skills gaps and shortages which exist across the industry.

Next Steps

Chemical employers are key to the development of the Sector Skills Agreement and Cogent is acting as their voice, under their guidance and input, in ensuring that the UK skills supply meets their current and future needs.

The SSA process takes place over five important phases. We are asking employers to participate and are consulting with them at every stage.

- This document is a summary of phase one, the **Skills Needs Assessment (SNA)** which provides an overview of the Cogent SSC sector in relation to workforce size and shape and current skills needs both now and in the future.

- The next phase is the **Assessment of Current Provision** which will report on both the quantity of training and qualifications provision and the quality and relevance to employers.

- The third phase in this process is the **Gap Analysis**. This will use the findings from the first two reports, as well as a study of future scenarios as agreed with employers, to identify gaps in current training and qualifications provision. During this stage Cogent will be consulting with employers via its website, telephone surveys and through its Employer Advisory Councils to develop a series of possible skills solutions as the basis for an action plan.

- Stage Four is the **Assessment of the Scope for Collaborative Action** and this will build upon the solutions suggested within the Gap Analysis. We will be joining with stakeholders and employers to look at how these deficiencies can be tackled and what form action might take. This process will take the form of workshops carried out across our industries during May.

- This final phase, **Developing an Action Plan** completes the SSA process, and results in the development of a resourced plan. This will include the contribution of each partner (private and public), quantified outputs, estimated impacts on productivity and competitiveness and an evaluation mechanism.

The resulting **Sector Skills Agreement** will fundamentally alter the way skills are demanded, delivered and developed throughout the UK and employer contribution is vital to their success.