Future Skills Requirements for the Advanced Manufacturing and Energy Sectors on the Fylde

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Executive Summary

The Manufacturing and Process Skills for the Future Group (MPSF) identified the need to assess the technical labour market across the Fylde Coast. MPSF is a private sector sub group convened by Blackpool, Fylde and Wyre Economic Development Company Ltd (EDC).

The aim of the report was to analyse the technical labour market in the Fylde region and make assessments and recommendations regarding the future.

In the current difficult economic climate it is encouraging to be able to report that employment in manufacturing is expected to remain robust and that here is growth in energy. It is projected that jobs in the sector will increase by between 300 and 500 over the next 5 to 10 years. This is a conservative estimate based on current employers and the figure is likely to be higher if there is investment in the supply chain and headquarters and supply chain activities can be encouraged to the area. In addition it is projected that there will be a replacement requirement of circa 5,000 technical people per year for the North West of England in order to replace those leaving in the next few years. However, on a positive note the number of young people available to join the workforce in the Fylde area is expected to increase. This bucks the trend for the rest of the North West.

The signs from the education system in the area are very promising. School attainment has increased over the last years across the area with very strong outcomes in Fylde and Wyre in particular. Further Education has an established record of collaborating on apprenticeship and vocational work with local (as well as national) employers. The two Lancashire based Universities (University of Central Lancashire and Lancaster) have academic expertise in nuclear, renewable energy and wave technologies combined with course provision at degree and postgraduate level. In addition there are well established practical programmes for non-technical professionals and managers. The research involved interviews and questionnaires with key local employers and desk based research and analysis. It is estimated that the research covers the employers of around 10,000 manufacturing employees. This equates to approximately two thirds of the manufacturing employees in the region.

The report highlights a number of key recommendations:-

- Communal apprenticeship schemes (extending to engineers & older skilled workers);
- An on-going employers' skills group forum;
- an HR manager's forum to share ideas on career planning, mentoring & coaching and management development;
- Student placements (possibly extending to sponsorships and PhD linkages);
- Closer & early working with local schools – including curriculum and career work;
- Collective responsibility through LEP/ skills sub group for addressing poor school grades and the issue of NEETS.

- Collaborate to attract funding (e.g. for supply chains, HQ relocations, Higher Education).

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1.0 Introduction

1.1 Background

This report was commissioned by the Manufacturing and Process Skills for the Future Group (MPSF) on behalf of the EDC. The MPSF group identified the need to assess supply and demand within the technical labour market across the Fylde Coast. This need has arisen because of the expected growth in the Energy sector combined with the projected difficulties of replacing older workers in some of the traditional manufacturing and process industries. The MPSF group were keen to engage local employers and gather data from education providers.

The MPSF group comprises of Addison Engineering, AGCCE, Blackpool Council, Blackpool & the Fylde College, BFWEDC, BIS, Cuadrilla, Kilgour Aerospace, Lancashire CC, National apprenticeship service, Springfield fuels (Toshiba Westinghouse), Victrex, Vinolitt, UPL (Universal Products) and at the time of this report BAe Systems. The longer term aim is for more organisations from the manufacturing and energy sectors to join MPSF.

The organisations surveyed/interviewed included many of the MPSF group and a number of other organisations from the energy and manufacturing sectors.

The **aim** of the report is to:

> **Analyse the technical labour market in the Fylde region and make assessments and recommendations regarding the future.**

Objectives of the report are:

- to assess current numbers employed in roles across sector
- to determine projected numbers to be employed
- conduct an audit to identify current & future technical skills
- identify current and future skills shortages

- assess personal skills/behaviours expected for recruits into various roles
- Analyse implications for education providers and give consideration to the development of young people in region.
- Consider possibilities for future funding

1.2 The Region

The Fylde Coast of Lancashire covers three local authority districts – Blackpool, Fylde and Wyre. The area stretches to the Irish Sea in the west, the Ribble estuary and Preston to the south, the Bowland Hills and moorland to the east and Pilling and Morecambe Bay to the north.

The majority of economic activity and population is concentrated in the urbanised coastal strip running from Fleetwood (Wyre) in the north to Freckleton/Warton (Fylde) in the south and incorporates the Unitary borough of Blackpool. Around 320,000 people live on the Fylde Coast in 2011[1] of which 58% were of working age (53% male and 47% female) employed in approximately 15,000 businesses.

The Fylde Coast economy developed from a largely rural and fishing economy through railway driven tourism expansion in the Victorian period. Tourism has remained the mainstay, especially in Blackpool, although this has been subject to steady decline in recent decades. The area also contains some major manufacturing industries such as the defence aerospace centre at Warton and nuclear manufacturing at Springfield in Fylde. In addition there are Hillhouse Business Park, Fleetwood Docks and the fish processing industry in Wyre. There are a range of other services such as finance, IT, and business services in Fylde. Agriculture continues to be important in most rural areas. Public sector employment as a proportion of the whole is especially significant in Blackpool and Wyre but is on the decline given government cutbacks.

[1] Investing in our homes and community – Fylde Coast Investment Plan, 2011

The manufacturing sector accounts for around 15,000 employees which is 11% of the working population[2]. These figures have declined from 20,000 (16%) in 2007.

This decline was most marked in Fylde with a drop of approximately 4-5,000 jobs but Fylde still has 31.6% of its working age population working in manufacturing. Blackpool and Wyre have seen a relatively stable manufacturing population. In 2011[3] Manufacturing accounted for 7.4% of the Blackpool working population, 9.9% in Wyre.. There are three strategic employment sites defined in the Fylde Coast Multi-Area Agreement[4] – Warton, Hillhouse and M55 Growth Hub.

Fylde is home to a high proportion (46%) of those engaged in higher-end occupations and correspondingly a low proportion of those working in lower-end occupations (22%). Wyre broadly follows this pattern although slightly more of the local authority's resident employees were engaged in middle-end occupations. In contrast, only 30% of those employed in Blackpool were found to be working in higher-end occupations in 2007 where as almost 34% were engaged in lower-end occupations pointing to some disparity across the Fylde Coast. There are large variations between Blackpool, which has the lowest earnings in Lancashire, and Fylde, with close to the highest. Blackpool's problems are compounded by a high level of seasonality in large parts of the job market.

Whilst manufacturing has been in slow decline many of the jobs that remain are at the higher end of the pay spectrum and a reverse in that decline would undoubtedly improve the economic outlook of the Fylde coastal region.

With the expected increase in jobs in the energy sector in the next few years this decline is likely to be reversed in the wider manufacturing segment of the economy. This will offer a welcome boost to the region during the current recessionary times but brings with it other potential problems. Local employers may be forced into fierce competition from a labour market pool that is likely to shrink due to the ageing

[2] Lancashire County Council 2011

[3] Investing in our homes and community – Fylde Coast Investment Plan, 2011

technical population. [4]

1.3 Demographics

As with the UK, the region's population is ageing with 21% (70,600) of people aged 64 or over compared to 16% across both in England and the North West region. The proportion of those aged between 15 and 64 i.e. the working age population is 63% of the total population (206,700 people).

Projections to 2031 suggest that the population of the Fylde Coastal area will expand by around 56,100 people with the number of those aged 25 to 64 is projected to expand by 12,000. However, most of the increase in this age band (25-64) is likely to be seen over the next ten years with an increase of 10,300 people from 2009 to 2019 and just 1,700 from 2019 to 2031.

Whilst there is a sharp drop in the number of people aged 15 to 24 is expected across the North West there is a much more positive outlook for the Fylde Coast. By 2031 the number of people aged 15 to 24 is projected to have increased by 1.7% from a 2009 baseline position. This compares to losses of 1.2% in Lancashire and 3.3% across the North West. The population aged 25 to 64 is expected to expand by 7.1% in the Fylde Coast area (2009 to 2031) compared to 5.5% and 3.3% across Lancashire and the North West respectively.

1.4 Education

There has been a steady increase in school outputs at GCSE and A level across all 3 local authority areas of the Fylde Coast. Whilst Blackpool (76%) is still below the national average both Fylde (84%) and Wyre (83.3%) are well above the averages for the North West (77.7%) and England (76.1%) for school leavers with 5 GCSEs at A*-C.

Across the region there are around 20-30% of the total working population with no qualifications. Fylde has 21%, Wyre has 26% and Blackpool has 31% with no

[4] The Fylde Coast Multi Area Agreement

qualifications.[5]

Across the general population of the Fylde Borough 29.80% have a degree or higher, in Wyre this is 23% and in Blackpool 15.5%.

It should also be noted that employers are directly engaged in the education process through apprenticeships and paying the fees of employees to undertake courses in Further and Higher Education.

1.5 Social Issues

The Fylde Coast is generally a vibrant area but it also has pockets of the population affected by social problems (worklessness, NEETS (Not in Employment, Education &Training) and deprivation). These problems are largely focused in parts of Blackpool and to a lesser extent in Fleetwood. Benefit claimant figures for these areas are up[6] with several areas in Blackpool having more than 8% (some as high as 15%). The NEETS figure for Blackpool is around 20% [7] which is the 4th highest in the UK. A recent study[8] has shown how benefit capping is likely to take around £82M out of the wider Blackpool economy.

[5] Neighbourhood statistics, ONS, 2013.
[6] NOMIS, 2012
[7] Annual Population Survey, 2012
[8] Beatty & Fothergill, 2013.

2.0 Methodology

2.1 Introduction

The research team were asked to approach organisations in the manufacturing, process and energy sector to determine a number of objectives:-

- Current numbers employed in various roles across the respondents
- Projected numbers to be employed in 1, 5 and 10 years' time
- conduct an audit to identify current & future technical skills
- identify current and future skills shortages
- An assessment of personal skills and behaviours expected for recruits into various roles
- An analysis of the implications for education providers and the development of young people in the region.

A mixed methods approach was preferred by the research team in order to determine both quantitative and qualitative research data. A range of methods were employed:-

- Questionnaires
- Interviews
- Documentary analysis
- Case study approach

Employers were asked to complete a questionnaire which included a quantitative element along with some skills based questions and some qualitative data gathering. The employers were also interviewed about the results of their questionnaire. Education providers were interviewed to analyse the current provision on the supply side. In addition, a desk based documentary analysis was conducted to assess current research publications, demographic data and other public information. From this secondary analysis we also identified a case study from the oil and gas sector which we report upon in our findings.

2.2 Questionnaire Design

The questionnaire used generic job roles. The research team determined that it was better to use generic job roles as job titles vary from organisation to organisation. Information was analysed from a wide variety of organisations and professions and drew upon their experiences from the Manufacturing and Process sector to create a list of generic job roles. These roles were then tested with the Manufacturing and Process Sector steering group. A final list of job roles was then created, tested and accepted by the Skills steering group (see Appendix 1).

The questionnaire design drew on the widely accepted principles[9]. A combination of open questions and short closed questions were used. The open questions were designed to allow for freedom and spontaneity as well as probing. The closed questions were designed to offer an easy process requiring little time in order to achieve quick responses and easy comparisons[10]. Several of these short closed questions were based on a massive amount of skills data from a variety of engineering organisations and studies (see below 'Technical Skills'). As such the questionnaire employed an *a priori* code book[11] or template[12]. Here a hypothesis of technical skills created from previous research in the sector was being tested. A similar approach was used in relation to personal skills and behaviours. This approach allowed for large amounts of previously researched data to be tested quickly and efficiently. In all these cases the questionnaire left space for additional skills to be added by respondents. This approach was taken because job holders and their managers are usually unable to list every learning requirement for job roles when defining a curriculum[13].

2.2.1 The questionnaire (see appendix 2) – focused on:-

a) Numbers of employees now and projected in the future

- Current number employed in generic job roles

[10] Oppenheim, 1992
[11] Oppenheim, 1992
[12] Miles & Huberman, 1994
[13] Miller & Crabtree, 1992
[13] Gherardi & Nicolini, 2002

- Current vacancies in each job role
- Numbers expected in job roles in 5 and 10 years' time
- Reasons for any significant changes

b) Jobs and skills

- Specific jobs that are difficult to recruit for and how this is dealt with now
- Skills that will be needed in the future, but lacking in current workforce
- Extent of personal (softer) skills required in each job role (e.g. communication, personal development etc.)

c) Behavioural analysis

- Key behaviours required for each generic job role

d) Skills analysis

- Key skills required for each generic job role

Questions about career planning processes

e) Qualification requirements for entry to specific generic roles

2.3 Theoretical Underpinnings of Questionnaire

2.3.1 Personal Skills

Ten key personal skills were taken from an earlier study[14] conducted in the process industry. These skills were……

Communication – Active listening, reading between the lines, open style with others, able to express yourself to others so you are clearly understood

Information Processing – Organise and store information so it's easy to find, make meaning from the information worked with, always in the know with the latest information needed for work

Working with Others – Able to gain commitment of others, can persuade people whilst maintaining relationships, get on well with others, able to handle difficult situations involving differences of opinion

Organisational Skills – Able to prioritise, to anticipate problems before they arise, organise work timetable effectively.

[14] Vickers, 2008

Completing and Controlling – Identify and use the best ways to get work done, deliver what is needed to required quality standards, keep their work on track and to plan

Reviewing and Evaluating – Get feedback from others without being prompted on how work is going, look for root causes rather than quick fixes, take time out to reflect on how things have gone

Decision Making – Able to make decisions easily, make decisions based on information and facts to hand, able to use headroom for decisions to the full.

Personal Development – Know what their learning needs are, can clearly manage their own learning without waiting for the boss to, find it easy to acquire new skills in all areas of their work.

Personal Management – Can assert themselves when the situation arises, they have an objective view of their strengths and weaknesses, they personally feel they can control their work.

Ideas for Improvement – Able to take initiative in suggesting ideas, positive in the face of change and ambiguity, can easily turn ideas into action.

2.3.2 Technical Skills

The research team developed a list of technical skills from a variety of UK[15][16][17][18][19][20] and American studies[21][22]and from professional bodies[23][24][25][26]. The original list of skills was then reduced down to a more manageable size for the purposes of the questionnaire. The list was tested with engineers, then tested with and accepted by the Skills steering group. The technical skills are shown in **Appendix 4**

[15] Cogent, 2012a
[16] Cogent 2012b
[17] Edxcel, 2013
[18] Stier, 2006
[19] Prospects, 2012
[20] AstraZeneca, 2012
[21] Boeing, 2006
[22] Employment & Training Administration, 2010
[23] Engineering Council, 2011
[24] IChemE, 2013
[25] IMechE, 2013
[26] Royal Society of Chemistry, 2013

2.3.3 Key Behaviours

Key behaviours or competencies were taken from a wide-ranging behavioural event 'research based'[27] interview study conducted in the Process Industry[28]. The original study was conducted by consultants using first generation competency experience[29][30][31]. In particular the Research Team have drawn on the distinguishing behaviours for Manufacturing, Engineering Technical and Scientific job roles. These behaviours include:-

Thoroughness – *seeking completeness and accuracy*

Strategic Influencing – *being aware of different forms and sources of influencing in choosing between different influencing strategies*

Concern for Impact – *actively anticipating and responding to the feelings, needs and concerns of others*

Interpersonal Awareness – *drawing inferences about and maintaining of others' interests, moods and concerns*

Analytical Thinking – *logically breaking problems down into their essential elements; carrying out diagnosis and developing solutions*

Conceptual Thinking – *identifying key issues, seeing relationships and drawing elements together into broad coherent frameworks*

Results Orientation – *focusing attention on key objectives; wanting effective outcomes*

Initiative – *engaging in proactive behaviour; seizing opportunities*

2.4 Administration of Questionnaire

2.4.1 Piloting

[27] Briscoe & Hall, 1999
[28] Chemicals & Polymers, 1989
[29] Boyatzis, 1982
[30] Klemp, 1982
[31] McClelland, 1998

The questionnaire was piloted. Firstly they were tested for clarity of instructions and response processes by two independent people. The questionnaires were then tested for their technical content on some professional engineers. Finally the questionnaires were tested with and accepted by the Skills Steering group.

2.4.2 Sample

The original sample was 15 organisations in the Manufacturing and Energy sector. Most of these organisations were part of the MPSF. Four organisations immediately declined to take part when contacted but three of these subsequently provided some information when asked again.

2.4.3 Response Rate

Eleven organisations agreed to be interviewed and to complete a questionnaire. Ultimately, once the organisations had been approached only 9 organisations actually agreed to the interview requests and 7 completed the questionnaire. In the case of some organisations 4 or 5 attempts were made to get them to respond to the questionnaire unfortunately, none of the organisations completed the questionnaire. In addition to the organisations that agreed to be interviewed and completed questionnaires 3 other organisations provided some information to the research team even though they decline to take part formerly. As such the survey covers a workforce population of circa 4000 employees with additional information covering a total of circa 6000 employees. So the research we report here refers to around 10,000 employees which equates to two thirds of the manufacturing population on the area.

Due to the response rate from some of the energy organisations and the need for confidentiality and anonymity agreed at the outset some of our data is based on economic projections. We have outlined the basis for these projections below.

Projections

a) At the time of writing Westinghouse are awaiting the outcome of current reviews within the nuclear sector and we have agreed to adopt a steady state projection for

the next 10 years. This can obviously change depending upon the outcome of the reviews.

b) The day after the interim report was produced the planning application for Halite was rejected by the secretary of State and the figures assume that Halite will not know be progressing with operations in the area. At the time of this research the Secretary of State has just announced that there will be no underground gas storage in the area. Halite, who had made the proposal, has indicated that they would consider the ruling and decide whether to appeal. We have assumed that the present outcome will be upheld.

c) We have assumed that Cuadrilla will continue to operate and expand in the region.

d) Attempts were made to gather data directly from a number of offshore energy companies but we were unable to gain the information from them directly and as such we have had to make projections based on a number of sources.

Currently there are plans for 6770 megawatts (MW) of energy generation in the offshore area in the Irish Sea north of Liverpool/North Wales to Barrow. It is suggested that 0.11 to 0.54 direct jobs are created per MW over a 20 to 30 year timescale[32]. For example, BVG[33] suggest a figure of 0.4 long term direct jobs per MW in a report for the UK government. Using more conservative Scottish Government[34] projections on immediate construction and longer term maintenance/engineering jobs we have identified that 1 construction job is created for every 1.5 and 3 MW and 1 on-going maintenance/engineering job created for every 20-30 MW.

2.5 Interviews

There were 9 interviews conducted with local organisations and 3 more provided specific information requested of them even though they declined to take part in the process. Two of the major education providers were interviewed and an analysis of course details was conducted of local FE and HE organisations.

[32] Navigant, 2013
[33] BVG, 2009
[34] Scottish Government 2011

2.6 Documentary Analysis

A wide range of research has already been conducted on the Fylde area and this along with other publicly available data was used in the research. Documentary analysis involves the analysis of documentation that contains information about the topic or phenomenon being studied[35] . Documentary analysis enables the interpretation of some of the other data gathered in a wider context [36]. The reports and public information are interwoven into our report but all sources are clearly referenced as they are used and again in the references section at the end of the report.

2.7 Case Study Approach

As part of our documentary analysis and assessment of public information we uncovered an example of skills studies with similar issues in the oil and gas sector in Aberdeen. We have taken some of these findings and presented them in the Findings section as a case study. It is suggested that the case study method allows for the triangulation and testing of results[3738]. In addition case study analysis can be used to test the generalizability (or transferability) of results and proposed real-life interventions[39] and that is how we have employed it here. We have particularly used this case to inform our recommendations.

2.8 Ethical Considerations

All data provided by respondent organisations is either presented anonymously or grouped into overall scores. If an organisation could be identified from the data we have either not included that data or we have gained permission to use it as an example. Where the data is taken from publically available sources this is included as it is not regarded as private information.

[35] Bailey, 1994
[36] Payne & Payne, 2004
[37] Yin, 1984
[38] Stake, 1995
[39] Yin, 1995

3. Findings

3.1 Labour Market Demand

3.1.1 Business Outlook

Our report focuses on the manufacturing, process and energy sector of the economy. In recent reports it has been suggested that manufacturing is in decline and accounts for around 11% of employment. However, these jobs have traditionally been at the higher end of the pay scale – especially in engineering and large manufacturing organisations. As such these roles have a greater multiplier effect and thus help the economy in a positively disproportionate way.

Some of the large manufacturing organisations are projecting that they will remain at present levels of employment for the next 5 to 10 years (e.g. BAe, Lofthouse, and Westinghouse). In advanced materials Victrex are likely to increase staff numbers by 10% with their new production facility at Hillhouse. The research found no evidence to suggest a further decline in the traditional manufacturing sector across the region (e.g. Aircraft, Nuclear, Chemicals). However, there is rapid expansion expected in the Energy sector (e.g. Cuadrilla, DONG, and others) over the coming years. The current employment levels in the sector are around 15,000 people. The research indicates an increase by between 300 and 500 employees with peaks much higher than that during various start-up/construction phases.

As outlined above in section 2.4.3 some of our data is based on economic and/or respondent projections. In offshore wind we believe that 200-300 on-going jobs will be created and around 1000-2000 construction roles over a 5 year period. Not all these jobs will be in the Fylde Coastal Area as some wind farms are resourced off Barrow. It also needs to be borne in mind that there is a level of scepticism over such industry and government projections. At best job creation (rather than displacement from the sector) if it happens at all may be confined to the local or regional area.[40] SQW[41] and Bain[42] project a base case figure of around 32,000 full time employees

[40] Hughes, 2011
[41] SQW, 2008
[42] Bain, 2008.

working in wind power by 2020 with approximately 25% of that number being in mechanical, electrical and fabrication trades and engineering.

In the next 5 years we expect overall increases in a number of areas (the full breakdown of our research is shown in Appendix 7):-

Job role	Increase over next 5 years	Additional Energy jobs
Unskilled/ Semi Skilled in Construction	200	700 (although likely to be a smaller number of transient employees/contractors)
Engineering/Maintenance Apprentices	10-15	0
Process/Manufacturing Apprentices	5	0
Electrical & Mechanical Engineers/Technicians	23	20-30
Fabrication Technicians (e.g. welding)	0	20-25
Safety roles	15	2-3
Materials Scientists	3	0

3.1.2. Business Requirements

During the interviews a number of businesses raised issues about the quality of their younger recruits from the education system. Whilst employers were generally happy with the technical/academic knowledge of their new recruits they were unhappy with their work skills and attitudes. This tended to be more targeted at Further Education and School leaver recruits.

> *"The attitude of young folk is difficult they mess about on web sites and mobile phones and need a readiness to actually do their work".*

"Recruits have good GCSEs but they need to learn more about how to utilise the theoretical in a practical and functional way".

"The education systems is seen to be focus on passing examinations. For us, knowledge apart, the key areas are work attitude and working in a team".

"They have computer skills, can read and write but we also look to recruit folk with problem solving skills as few seem to have it – so applicants who have done part time jobs or Duke of Edinburgh seem to be more rounded and employable".

The view of University recruits was different generally due to the nature of engineering qualifications

"Most university recruits have the required functional skills in engineering framework so they tend to be ok"

The availability of higher quality candidates caused by the recession was also mentioned.

"We have some very good applicants who might otherwise have been at [top ranked international organisations] but for the recession."

However, organisations are still coming across graduates who have no vocational experience on their CV.

"We need people with vocational skills and experience. To be honest we would probably not recruit people without vocational experience".

Jobs at the lower end of the skills spectrum are covered in one organisation by a 13 weeks probationary period which allows the company to review behaviours/desired skills

3.1.3 Skills

a) Technical Skills

The study asked organisations to identify skills that were desirable and essential for a variety of job roles. The list of skills was generated from a range of industry bodies, professional bodies and studies (see page 13). There were clear patterns within the results that demonstrated a strong consensus for specific skills. All the data is shown in Appendix 4 here we report on the key skills required by employers from education providers and in their recruits.

Key Technical Skills Required in Most Job Roles

There was a high degree of consistency amongst respondents on a number of key skills that were required in the large majority of technical job roles. All of which make good common sense in high hazard manufacturing environments. These key skills were: - safety; quality control; manufacturing standards; and dealing with hazards.

In addition to these generic key skills there were a set of additional key skills that were consistently identified by respondents in relation to more senior technical roles i.e. Chartered Engineers of all disciplines and Scientists/Chemists. These skills were:- assess workflow/work progress monitoring; managing inventory/stock control; understanding production materials; process assessment; trouble shooting process; measurements/estimations; preparing equipment; testing performance of equipment; manufacturing planning; investigating/solving production problems; ordering materials; work sequencing; receive and check incoming materials; supervising work.

As well as the key generic skills listed above and those for more senior technical roles there were some specific job role technical skills that were rated as key on a consistent basis by respondents.

Apprentices

As well as the key generic skills the other skill consistently identified by respondents for apprentices was interpreting engineering data and documentation.

Electrical Engineers

For electrical engineers as well as the key generic skills and those for senior technical roles a number of other key skills were consistently identified by respondents. These include: - fault location in systems/equipment; maintenance of systems/equipment; determine feasibility of repair; ordering tools and line trails of development products.

Chemical/Process Engineers

For chemical and process engineers as well as the key generic skills and those for senior technical roles a number of other key skills were consistently identified by respondents. These include:- monitor and control manufacturing processes; precision measurement; use of hand tools; analysing and conducting research to develop theories, techniques and testing the reliability of outcomes under different conditions; developing practical applications of experimental and research findings; redeveloping the industrial process to improve yield, or plant/production efficiency; laboratory and pilot scale analysis/operations; fault location in systems/equipment; maintenance of systems/equipment; determine feasibility of repair; ordering tools and line trails of development products; and product development/transfer to full-scale production.

Materials Scientists

There a number of key development requirements for Materials Scientists over and above the generic ones listed above. These include: - transferring materials; analysing results of inspection; precision measurement; using and communicating technical information; ability to read and interpret manufacturing documentation; calibrate instruments; analyse drawings (CAD); ordering tools; robotics; precision measurement; use of hand tools; exploit new/advanced technology & development; conducting experiments and tests to identify the chemical composition and reactive properties of substances and processed materials; analysing and conducting

research to develop theories, techniques and processes, and testing the reliability of outcomes under different conditions; developing practical applications of experimental and research findings; assessing formulations and alternative raw materials; redeveloping the industrial process to improve yield, or plant/production efficiency; analysing reactions, synthetic sequences and purification techniques; laboratory and pilot scale analysis/operations; product development/transfer to full-scale production; and line trials of developmental products.

Senior Chemists and Researchers

Along with the generic key skills listed above for all jobs Senior Chemists and Researchers were reported to require a number of other key skills. These were: - receive and check incoming materials, analysing reactions, synthetic sequences and purification techniques; and laboratory and pilot scale analysis/operations.

Managers

Managers of technical staff are also seen by respondents to need a range of key skills including:- preparation for and/or conclusion of manufacturing operations; controlling manufacturing operations; handover of manufacturing operations; receive and check incoming materials; transferring materials; analysing results of inspection; assess workflow/work progress monitoring; managing inventory /stock control; trouble shooting processes; manufacturing planning; monitor & control manufacturing processes; ability to read & interpret manufacturing documentation; analysing reactions, synthetic sequences and purification techniques; laboratory and pilot scale analysis/operations.

The list of skills used in this study was based on a number of industry/profession wide skills standards. It is outside of the remit of this report to redefine those standards and this is a small sample size. However, this information is useful in terms of discussions between employers and education providers in developing courses and apprenticeship schemes.

b) Personal Skills

Respondents were asked to rate 10 personal skills against specific job categories and the overall results identified a broadly generic pattern (see appendix 5). The results show that technical staff who are above the apprentice level are expected to have a relatively generic set of personal skills. Completing and controlling work and processing information about that work are seen to be the key personal skills requirements for technical job roles. The focus is on practicality and getting the job done. This is then achieved by the next two key personal skills of communication and working through others to achieve those results. In competency terms this means the focus is on results orientation (i.e. driven to deliver) combined with influencing skills. Apprentices have a similar set of personal skills requirements but it is probably to be expected that employers did not expect them to have developed decision making or personal managing skills at that stage of their careers. This data may be of some use in discussions between educators and employers.

c) Behavioural Requirements

Respondents were asked to rate a series of desirable/essential behavioural statements against key job roles. There was strong consistency of results across organisations with a strong split between more senior technical staff/ managers and lower level roles/apprentices. Full results are shown in Appendix 6.

Senior Technical Roles/Managers

Chartered Engineers, Scientists/Chemists appear to require 6 key competencies: -

Concern for Impact; Analytical thinking; Thoroughness; Results Orientation; Initiative; and Strategic Influencing. This fits the pattern of previous studies[43]. This suggests task focused technical staff who are driven by the need to achieve, influence people in order to achieve, pay attention to detail and take key action before events overtake a situation and thinking is based on the analysis of systems and processes.

For Managers we also see a higher score for Interpersonal Awareness which again we would expect to see as this behaviour is about understanding others and drawing

[43] Chemicals & Polymers 1989.

inferences from interpersonal contact. This combined with Concern for Impact is key in managing people effectively.

Junior Technical Roles/ Apprentices

At lower levels there is a broad consistency on specific competencies. These competencies are still critical to the lower job roles but they are rated lower than higher level job roles.

The key competencies here are: - Concern for Impact; Thoroughness; Results Orientation; and Initiative. Within these competencies there are a number of key behaviours that appear to be more important than others.

Concern for Impact – the focus here is on maintaining the individuals' professional reputation and credibility.

Thoroughness – the focus is on careful preparation and checking accuracy.

Results Orientation – here the focus is on communicating results and tasks to be done

Initiative – Is about taking actions before being forced to by events.

This shows, not surprisingly, that lower level roles are focused on individual actions and behaviours aimed at doing a good job to the right standard.

3.1.4. Labour Turnover

In most organisations there is low labour turnover. Responses included:-

"*Only 1 leaver in 5 years";*

"Not a major issue";

"Low turnover – 3% company proud of this";

"People tend to stay";

"Very low turnover".

When employees do leave there is evidence of poaching from other employers (also in the research sample)

For example:-

"We lose [employees] through direct competition from our neighbours";

"We lost [a number of] operators… partly due to the uncertainty about our [future]."

This pinch and pay kind of approach to human resource planning is likely to get worse with the increase demand for labour from the energy sector unless the sector manages the situation more proactively.

Whilst leavers are not a major problem a worrying trend reported by some organisations is that leavers tend to be younger where there is no jobs for life mentality. At this stage low labour turnover is a relatively good position but the increase in opportunities in secure roles in the Energy sector may well cause some churn and create replacement issues. There is also a slowly ticking demographic time bomb in the ageing workforces of the businesses at Hillhouse. The legacy of a strong ICI pension scheme and change sin legislation mean that staff at Hillhouse can choose when to retire. Good pensions in the past increased retention and modern day pensions for most organisations are not as generous and usually more portable.

Retention strategies could be discussed across the sector as a whole. The two key issues are:-

- losing employees to each other in a pinch and pay situation
- losing current or future engineering/science staff to other regions.

In the latter scenario some young people will leave for universities elsewhere in the UK and not return, young engineers may leave the region for other opportunities and staff who reside outside the area with long work commutes may get better offers closer to their home base.

3.1.5 Recruitment Issues

Certain positions are particularly difficult to fill these include: senior managers, development chemists and instrument technicians (electrical control).

Senior managers have been recruited and are travelling to work from as far afield as Leeds and development chemists from Manchester. The issue of electrical control staff is however, much more serious. One organisation likened them to pilots *"what are they for and why do we pay them so much then we have take offs/landings/ emergencies"*. One respondent said that this appears to be a problem nationally *"Difficult to get Electrical Control and Instrument Engineers across the sector e.g. Rolls Royce & EDF saying the same."*

In one case an organisation had failed to get Process Plant apprentices and felt it was due to a *" lack of local training provision"* so had resorted to in house training.

Another organisation said that whilst it was not currently a recruitment issue it was an essential *"requirement to have 6 process operators per shift – the business cannot run without these shifts being fully complemented."* As such this business had looked at ways of training people in house to take the roles on a temporary basis with the aim of a permanent move.

In addition there are a range of specialist roles that are difficult to fill and are specific to particular businesses. These include such roles as Safety Case Preparation staff in the Nuclear industry; cosmetic formulation chemists, Energy traders/analysts; and Waste auditors.

There are currently vacancies for Process/Manufacturing Apprentices; Engineering/Maintenance Apprentices; Process Manufacturing Operators; Electrical and instrument Technicians; Electrical Engineers and Senior Chemists (see Appendix 7 for more details).

3.2 Labour Market Supply

3.2.1 Education Outputs and Provision

There has been a steady increase in school outputs at GCSE and A level across all 3 local authority areas of the Fylde Coast. Whilst Blackpool (76%) is still below the

national average both Fylde (84%) and Wyre (83.3%) are well above the averages for the North West (77.7%) and England (76.1%) for school leavers with 5 GCSEs at A*-C.

Percentage of school leavers with 5 GCSEs at A*-C.

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Blackpool	38.0	40.1	37.3	41.8	49.9	52.2	55.2	66.3	76.0
Fylde	58.9	62.5	56.2	62.8	64.8	71.7	68.5	86.6	84.0
Wyre	49.1	56.2	55.2	56.3	62.2	63.3	70.3	77.1	83.3

At Advanced A-level in 2012 the results across the area are encouraging with over 90% of those submitted for examination achieving 2 or more A level passes

Table 2 A Level Data

A levels 2010	2 or more A*-E	Number of those submitted
Blackpool	98.2 %	1358
Fylde	95.9%	172
Wyre	91.6%	532
North West	95.2%	-
England	94.4%	-

At the Higher and Further education level nationally there are only 76,200 students studying the physical sciences and a further 127,300 studying engineering and technical subjects. We are therefore dealing with a finite pool and not all these students will opt for a career in the manufacturing, process and energy sector[44]. Skills level data for 2010 for Fylde, Wyre and Blackpool[45] shows that Fylde had a

[44] Department of Education 2011
[45] Annual Population Survey ONS 2010

much higher concentration of Level 4 qualified people – skewed by the presence of BAe and Westinghouse/Springfields (see Table 3)

Table 3 – Skill Levels in the Population

	Level 2	Level 3	Level 4
Fylde	78.8	60.2	42.5
Wyre	65.9	45.6	27.9
Blackpool	62.6	40.0	19.4

Level 2 = 5 GCSEs/ 2 A/S; Level 3 = 2 A levels; Level 4 = HNC/HND/Higher degree/ PhD.

Further Education is the predominant training and learning destination for young people in Blackpool – over 70% in FE, compared with 63% in Fylde and Wyre, and 58% regionally (2007) – this partly reflects the limited number of school sixth form places in Blackpool.[46]

The travel to learn figures show that the majority of learners engaged in FE in Blackpool live and learn in the area, compared with a third of Fylde learners and 20% of Wyre learners who learn in the area where they live – this largely reflects the location of training provision. For those learning outside the Fylde Coast, most travel to Preston. [47] For the North West as a whole of those domiciled here 73.3% tend to study in North West higher education establishments. Of North West residents there are 9.1% who go to study in Yorkshire and the Humber region and 3.4% in the West Midlands. This suggests that the vast majority prefer to study relatively close to their home town. In contrast the North West tends to import more than it exports in terms of students from elsewhere in the UK. This suggests that local employers need to target school students locally and focus on universities in the North West, Yorkshire and Humber and West Midlands to target locals to say or return to the North West region[48]. These figures are form 2009 and changes to student finances will mean that more students stay closer to home.

[46] Annual Population Survey ONS 2010

[47] Fylde Coast Employment & Skills Strategy Annex to Strategic Framework.

[48] ONS, 2009 HE Numbers.

Employer Contribution to Development and Future Supply of Skilled Labour

The contribution employers make to developing their staff and therefore through that development upskilling the wider labour market. The research identified several examples of employers who pay for and/or give time off for employees to undertake further technical, professional and personal development. In a few cases employees then left their employer (in most they did not). This development provides a positive benefit for the wider local labour market. The role of employers must be recognised in this area and with the help of other stakeholders can act as an important catalyst in regional skills development. We would suggest that more needs to be done in this area to stimulate more workforce development at all levels, including technical, professional and management skills. Some employers in the UK adopt a "golden handcuffs" approach to development where employees have to pay back a proportion of the cost of external training if they leave within a certain timescale. Whilst these clauses can improve retention figures they are difficult and expensive to enforce in practice and employees who are really keen to leave may stay and become disaffected. As such there are pros and cons to such an approach.

Most education bodies involved in supporting the employment and skills agenda have one-to-one (rather than shared) contacts with employers in the area[49]. There is little evidence of co-ordinated working. Rare exceptions include an apprenticeship training scheme where one organisation trains apprentices on behalf of another.

There is a collective responsibility upon the education system and the private sector to increase the skills profile of the region. It is essential that there is more upskilling from NVQ levels 1 and 2 to NVQ level 3 along with an increase in level 4 qualifications. There are also significant economic gains to be had from increasing the leadership and management skills of the region's workforce.

As part of the employer's development of the wider workforce through their own internal processes we identified 3 areas for consideration from our interview process: - internal career/succession processes; management & professional development; student opportunities.

[49] Fylde Coast Employment & Skills Strategy 2009

3.2.2 Career/Succession Processes

A small minority of organisations had full career and succession planning processes. However, most organisations said that they were considering developing their career processes. In some organisations *"usually staff fall into roles"* or careers planning is reactive based on employee demands e.g. *"personal development", "reactive with in-house training and when indicated as a requirement".*

3.2.3 Management and Professional Development

Management development and the development of non-technical professionals (e.g. Finance, HR) tends to be *"piecemeal", "hotch potch",* with little formality in place. Some organisations had made attempts to develop managers through local education providers but these initiatives had stalled. As such in most organisations management and professional development is *"Employee driven – if training is requested then it is considered".* At best some employers have chosen to *"grow their own"* professionals and senior managers and others recruit from much further afield and employ staff, who then commute long distances.

3.2.4 Student Opportunities

Many of the organisations interviewed did not currently take sandwich placement students or interns but many expressed a willingness to consider it in future. *E.g. "No [sandwich students but] would consider requests"; "Will probably consider in the future"*

One organisation had taken placement students and it had turned out to be a success. "Had … 2 industrial placements to cover the maternity leave of a PhD and it led to one person being a permanent recruit."

In relation to higher level students, sponsorships and PhD linkages there was less of a demand. However, the idea of collaboration on research projects was given a favourable response by a minority of organisations.

3.2.5 Provision of Further and Higher Education Courses

Engineering courses are widely available locally at all levels ranging from Apprenticeship and Level 2 through to degrees and higher level qualifications. Further Education Colleges at Blackpool & Fylde, Morecambe & Lancaster and Preston provide a variety of apprenticeships through to pre-university courses with some university courses operated under licence.

Of the organisations interviewed there are already good connections between employers and FE on apprenticeships at both Blackpool & Fylde and Preston. Blackpool & Fylde are also in discussions with a number of organisations in the energy sector on future course and needs. Blackpool & Fylde College has developed a strong reputation in the UK in engineering apprenticeships through work with the private sector e.g. Ford and Bentley.

The Universities at Preston (UCLAN) and Lancaster offer a variety of undergraduate degrees and higher level qualifications in engineering. UCLAN also specialises in Renewable and Wind energy and has made a strategic commitment to energy as one of its core areas for teaching and research now and the future. Lancaster's focus on renewables is related to water – particular wave, tidal and hydro power.

There is already significant interaction between some employers and local colleges and universities about future learning provision – especially in relation to a number of the Energy organisations. Confidentiality prevents us from disclosing full details but there are several one to one collaborations under consideration for training future employees.

In the current economic climate with low interest rates and return on investment (ROI) is often poor it is refreshing to note ROI in education is high. Higher Apprenticeships are valued at circa £17[50], £18[51] return per £1 spent and a return of between 27% and 33%.[52] There is a small positive contribution at NVQ 1 and 2 and a 20-29% return on NVQ 3 qualifications. There is a return of 10.8% for degrees, around 26% for Masters and 9.5% for Doctorates.[53]Investment in education of current a future employees therefore makes sound economic sense for businesses.

[50] McIntosh, 2007
[51] National Audit Office, 2012
[52] BIS Returns to Intermediate & Low Level Vocational Qualifications, 2011
[53] BIS Return on Higher Education Qualifications, 2011.

3, 2.6 Demographics

a) Age/ replacement

Earlier reports have suggested that young people will find employment by replacing older workers who retire. However, the concept of retirement is now somewhat blurred with there being no compulsory retirement age. Two distinct issues have been identified with replacement. First, it may not be a straight forward new for old process in the future. Employers may source their manufacturing in other ways (e.g. offshoring/relocating, multi-skilling/upskilling or even closure). Second, if the skill sets are not available older workers will be encouraged and even incentivised to stay on. This would mean younger people will find it harder to get employment. This problem is acute at the Hillhouse Business Park where several organisations report a move towards a potential replacement crisis. The replacement-retirement issue is also likely to affect larger employers such as BAe. The issue cannot be resolved quickly as there are not likely to be enough engineers and scientists in the mid-career age ranges of 30-45. Across the North West it is estimated that the manufacturing and technical population will need to find circa 5,400 employees to replace those leaving.[54]

Most organisations did not have a particular problem with replacement of older workers but there is a very notable exception to this for companies at the Hillhouse complex where the aging workforce inherited from ICI was a critical issue

> "Ageing workforce is a big issue for us. The majority fall within late 40s-mid 50s age rang"
>
> "It (replacement) is likely to be an issue. 80% of current workforce is over 50."

In the short term this problem is being offset by keeping in touch with older workers who have "retired" – so there is an option to bring them back in if the company requires extra to be carried out or to provide cover for a labour short fall. In addition there is a group of regular contractors across the Hillhouse site that could be used in the event of a short fall

[54] Semta, 2008

It is recognised that the age profile of the workforce in engineering is skewed towards older workers, and replacement demand will drive a requirement for new jobs with an indicative net requirement of 5,400 people per annum to 2014 to replace those leaving.[55] This presents both a significant opportunity for young people and a challenge for employers in the sector.

In 2008 the working age population was 58% and expected to grow by 3% up to 2015. In the period 2009 to 2013 the Fylde Coast population as a whole is expected to expand by around 56,000. The 25-64 age range is expected to expand by 12,000 – most of this increase expected in the period up to 2019 (10,300) with only an additional 1,700 in period 2019-31. In Lancashire as a whole the 15 to 24 age range will see a drop of 1.2% and a similar drop of 3.3% across the North West by 2031. However, the Fylde Coast area is expected to buck this trend with an increase in 15 to 24 year olds of 1.7%.[56]

b) Worklessness

The Hougton Review[57] considered worklessness as a key priority for local government and its stakeholders. Reliance on benefits is not good for the local economy as it usually means there are low levels of disposable income which in turn reduces the multiplier effect. In addition, there are strong linkages between worklessness, social and health issues. This problem is prevalent in the major towns of Blackpool and Fylde with concentrated areas of many who are unable to work.

The current claimant count is as high as 15% in some wards in Blackpool (see Appendix 3). Traditionally benefit claimant figures are lower in Fylde than in North West and UK but even here there has been a significant increase.[58]

c. NEETS

[55] The Fylde Coast Employment and Skills Strategy Strategic Framework – Annex, 2009
[56] The Fylde Coast Employment and Skills Strategy Strategic Framework, 2009
[57] The Houghton Review, 2009
[58] NOMIS 2012

The Government definition of NEETS focuses on 16-18 year olds, but the broader definition of 16-24 year olds more accurately captures the youth-to-labour market transition.[59]

In the North West there were 133,000 NEETS in Q3 2012.[60] Blackpool has traditionally been higher than the average North West percentage and is currently around 20%[61] or 1 in 5 of the 16-18 year old population.

The costs of young people who are NEET fall on the individual and also the wider economy. For the individual, the costs include potentially higher crime rates; lack of contact with the labour market[62] or the education system will damage the development of 'employability' skills; potentially higher use of drugs or alcohol[63]; and decreases in self-confidence, thus hampering re-employment[64].

For the wider local economy costs of NEETS include: - benefit payments; lost tax revenue; healthcare costs; criminal justice costs and loss of economic productivity from unemployment or underemployment.

It has been estimated that each 16-18 year old NEET has an average total public finance cost to society of £52,000 (in 2002 prices) over the course of their lifetime[65]. This would put the combined cost of Blackpool's NEET and unknown population at around £42M.

d. Deprivation

The number of people economically active in working age population is around the national average of 76.5% and unemployment is encouragingly low in Fylde (4.2%) and Wyre (3.7%) against regional (8.4%) and national (7.9%) averages. As Lancashire County Council notes however, there is a link between deprivation and education and in pockets of the population in Blackpool and Fleetwood the

[59] Work Foundation
[60] Department for Education, 2013
[61] Annual Population Survey, ONS, 2012.
[62] Bell, 2010
[63] OECD, 2008
[64] TES
[65] Godfrey et al, 2002

combination of high benefit claimant numbers, several generations of worklessness and NEETS results in a high level of deprivation.

Blackpool is rated as one of the most deprived regions (51% in the Index of Deprivation). 58,500 (41%) of the Blackpool population is in the 20% of regions classified as severely deprived and of these, 38,529 (27%) of the Blackpool population are in rated as the most deprived in the UK.

3.2.7 Travel to Work

In general terms there is a good local public transport system which is useful given that 37% of the Blackpool population have no access to a car. There are relatively easier and cheaper commuting options against job and earnings potential elsewhere.

However, there are three key problems with travel to work.

First, Blackpool and Fleetwood residents are less likely to travel outside the area they live in order to work. Given there is little work in these areas except for relatively low paid work, this exacerbates the problems of deprivation and worklessness.

Second, higher end job holders tend to travel greater distances to work so those commuting from Manchester, Cheshire and further afield to the north of the Fylde Coastal area are faced with a relatively poor road and rail infrastructure. This problem is potentially the opposite for the South of the region where people who work in higher end jobs are able to commute easily to Preston and beyond. Several employers in the Wyre area raised the issue of the difficult commute for their senior and professional staff.

Third, travel north-south through the region during the holiday season is difficult. The A583 congestion and no rail option at the Hillhouse end of the region are particular bottle neck issues.

3.3 Policy Change

With the introduction of Local Economic Partnerships (LEPs) in 2012[66], the so called

[66] HM Government, 2010

"Heseltine Review" [67] and the joint government response from the Treasury and the Department for Business Innovation and Skills[68] there is an increased focus on localism and change being driven by the private sector with public sector support. This is by no means a new idea. The Leitch Report[69] in 2006 has at its crux the need to establish a 'demand-led' and partnership approach which translates into engaging with employers and learners effectively in both understanding skills needs and ensuring that the supply of skills is responsive to employer and learner requirements. It also emphasised strongly the need to integrate employment and skills to help people prepare for and face challenges in the labour market.

Regardless of the politics of these proposals the principles require much more commitment and action from the private sector. Several interviewees indicated that education below University level was largely being "ignored" or "left to the local authority to manage". The interviewees also identified that some employers have no contacts with local schools and others do not see the need to interact at that level. This is by no means true of all organisations as there are also some employers who are heavily engaged with schools and Further Education. Some employers target Higher Education down to Sixth Form Colleges. This is in stark contrast to the case study (see below) we identified in Aberdeen for the Oil and Gas sector where all key stakeholders are working together and linking into the curriculum in a more structured way. This means a concerted and joint effort by the private sector in partnership with various public sector bodies (Councils, FE and HE providers). Previous studies identified that private sector organisations tend to have one to one relationships, rather than collectively, with the public sector[70]. The LEP and Skills subgroup are examples of this collective approach. As well as the case study example there are University and research partnerships that are closely tied to industry e.g. University of Aberdeen Oil and Gas Centre and the Northern Research Partnership which focus on the energy, oil and gas industry. A similar approach is

[67] Heseltine Review, 2013
[68] HM Treasury & Department for BIS, 2013
[69] Leitch Report, 2006
[70] *The Fylde Coast Employment and Skills Strategy Strategic Framework*

envisaged with the University of Central Lancashire's strong commitment to Engineering and Energy.

CASE STUDY – Your Future In Energy

Your Future In Energy is a pioneering initiative that aims to give school pupils clear paths into careers in the energy industry in Aberdeen.

Unlike previous initiatives aimed at encouraging pupils to enter the industry, Your Future In Energy is a cross-industry, streamlined programme integrated into the school curriculum and follows pupils through from primary six to the end of secondary school. The programme has been developed in line with the Curriculum for Excellence and has the support of the Scottish Government and industry leaders.

In particular, the programme aims to highlight the diversity of careers within the energy sector and the different routes into them, whether it be through university, college, apprenticeships, or other opportunities within the workplace.

Tom Clark, Managing Director of Your Future In Energy said: "This is the first time experts spanning the education sector, energy industry and training bodies have come together to map where the skills shortages lie, which competencies are needed to fulfill these roles, and in turn which school subjects will steer pupils towards achieving these.

"What's different about this programme is its ability to move beyond the recruitment fairs and more sporadic CSR initiatives to a more streamlined, cross-industry approach to securing the future talent that the energy sector so desperately needs."

The knowledge centre is a cloud-based oil and gas learning resource which gives pupils 24/7 access, from any device, to authoritative technical knowledge and information. Learning support tools allow pupils to build their own personalised content library for use throughout their education, supporting their future career choices and transition to the workplace.

Throughout the pilot week, as well as company visits, pupils, will participate in industry-led workshops on transferable skills, interview skills, CV building, psychometric testing and presentation skills, and attend an opportunity fair where they will find out first-hand the range of prospects the industry has to offer them. This is all before they choose their Highers subjects.

Your Future In Energy exposes pupils to jobs they might never have considered before, and crucially, helps them to understand where knowledge learned at school can be applied at work.

It is intended to roll this initiative out across North East of Scotland and beyond.

BBC Scotland News 15th January

Pioneering education Initiative to boost skills for energy sector

Wednesday, January 16, 2013 - 3pm

http://www.atlasknowledge.com/news/article/pioneering-education-initiative-to-boost-skills-for-energy-sector

4. Discussion

4.1 Demand

Demand for labour is set to increase due to a combination of a rapid growth in the Energy sector and the need to replace older workers in the north of the region. We see at least 300 new technical roles in the next 5 to 10 years combined with the need to replace existing older workers as they decide when to retire. The key area in the increase in demand for Electrical, Instrument and Mechanical engineers and technicians combined with the replacement need for Process/Manufacturing roles.

In some ways this report marks a crossroads in the demand and supply issue. There are two choices for the wider sector. The first is to continue to “poach” staff from each other in the knowledge that this practice will escalate. In addition such competition is likely to increase the wage cost of scarce labour resources. Second is a more co-operative or collaborative approach possibly extending to the sharing of resources. This suggestion perhaps cuts across the natural inclination to compete with other organisations but it is the pragmatic alternative in the circumstances the sector is faced with. Whilst we recognise that the private sector has traditionally had one to one relationships with the public sector this also needs to change to maximise the efficiencies/economies of scale. Ultimately the recommendations made in this report call for employers to engage even more with the supply side of this equation in order to help in meeting the demand requirements.

4.2 Supply

The key issue for the companies in the north of the region is that they have an ageing workforce and at present the number of replacements in the labour market is not enough. Already companies are actively recruiting for a number of skills from outside the area - most notably senior managers, chemists and other non-technical professions.

There were several employers in interviews who mentioned that the young people they recruited lacked skills. These skills included the ability to apply their learning in

a workplace and a general understanding of standards and requirements of the workplace. So knowing where the boundaries are in relation to mobile phones, Facebook and Twitter usage. Whilst these factors need to be borne in mind by education providers they are also based on societal changes. Whilst retention is not a major concern at this stage there is a trend for young people to leave and not expect a “job for life” and in the next 5-10 years this may develop into a problem.

Some employers are already providing a key contribution to the development of the labour market through sponsoring their own employees to development on college and university programmes. There are also some good examples of career and succession planning. However, this work needs to be even more co-ordinated and targeted to increase internal quality in an increasingly tight labour market.

More needs to be done at an earlier stage in the education system to encourage young people to see the benefits, attractions and prospects of a career in manufacturing and energy and then take appropriate GCSEs. This would need a level of co-ordination and partnership between employers collectively and educators.

There is a significant number of the working age population without any qualifications and whilst this is not the key focus of this report it would make considerable economic sense to turn this situation around through education and skills training.

4.3 Policy and Social Issues

Policy makers over the last 10 years have sought to encourage the private sector to become more engaged in education and determining educational outputs. This ranges from working on curriculum design through to considering what can be done about worklessness and NEETS. Even in a tight, demand driven labour market it is still relatively easy for employers to recruit the people they need and not address social responsibilities. However, as the case study example shows it is possibly to work at an early stage with schools to influence the curriculum and get involved in facilitating improvements in core subject areas. It is not to say that it is easy to turn these social problems around but active engagement with the workless in our local community can create longer term benefits. The private sector cannot drive this issue alone but more work needs to be done with local groups and stakeholders who are already active in this field.

5. Conclusion

The aim of the report has been to analyse the technical labour market in the Fylde region and make assessments and recommendations regarding the future.

The objectives of the report were to:

- Assess current numbers employed in roles across sector
- Determine projected numbers to be employed
- Conduct an audit of current & future technical skills
- Assess personal skills/behaviours expected for recruits into various roles
- Analyse implications for education providers and give consideration to the development of young people in region.

The research study gathered the views from 12 organisations through interviews, questionnaires and some e-mail contact. In addition the research team drew on previous research, data from government sources, policy documentation and a case study.

Overall we were encouraged by the response and support from the organisations that agreed to take part in the research and we believe this goodwill is a key stepping stone to taking many of the recommendations forward. We were also encouraged by the outcome that the Fylde Coastal area is likely to see an expansion in its Manufacturing, Process and Energy sector – largely through the rapid expansion of several very different energy businesses.

6. Recommendations

6.1 Working Together

a. An Employer-Educators Forum should be established around the existing Manufacturing and Process Sector Future Skills group

b. In general terms there needs to be better multi-business sharing/networking. For example an HR Managers/Officers forum would enable greater focus on the issues. Previous reports have suggested that the private sector organisations tend to have one to one relationships with public sector partners and this needs to change where the issues are cross sector in order to maximise returns/efficiency.

c. By working together it may be possible to attract funding for various of the other recommendations in this section. Funds are available through EOS (Employment Ownership of Skills); AMSCI (Advanced Manufacturing Supply Chain Initiative); RGF (Regional Growth Fund); SFA (Skills Funding Agency) (See Appendix 8 for more information).

6.2 Career Life Cycle

a. The key need would appear to be to create a career-life cycle approach for engineering and scientific jobs across the region. This would require the following:-

- A communal apprenticeship and advanced apprenticeship scheme – perhaps with one employer taking a lead or the establishment of a standalone company to employ apprentices, owned by the stakeholders and providing learning/work placements. Note: this idea has already been used in the Leisure and Entertainment sector at Blackpool Pleasure Beach/Zoo etc. Within manufacturing Westinghouse have been engaged in training apprentices for other smaller companies.
- This communal idea could be extended to graduate and engineer schemes where employers work together to manage the longer term careers of engineers and scientists with the key aim of keeping them in the Fylde catchment area. This would also prevent the competitive escalation

of salaries in a race to “empty” the limited labour supply. It is recognised that this would undoubtedly be harder to manage in a competitive environment. This could take a number of forms:-

- Sponsorship of undergraduates
- Individual employers to sponsor students through University with paid work placements in the Summer
- Clusters of local employers to sponsor students through University with paid work placements across the cluster in the Summer
- Establish an independent company (owned by the sponsors) to sponsor students through University with paid work placements in the Summer
- In all cases the sponsorship contract should include a clause committing graduates to work for 2 years post-graduation to ensure that all graduates spend at least 2 years working in the sector in the Fylde area.
- Recruit engineers and scientists to a “Fylde contract” or create a HR led career planning process across the sector or a cluster of employers. This would enable “swaps” and cross business career planning or short-term cover/experience. Similar to the apprenticeship company suggested above there could be an engineering/science equivalent – however, this is likely to be difficult to achieve and would need considerable co-operation and trust amongst partners.

6.3 Increasing the Supply Pool

a. Employ sandwich placement students to gain experience and to provide an “extended interview” for prospective recruits.
b. Sponsorship or part-sponsorship of PhDs on specific topics through a University
c. Encourage older workers to work beyond retirement on flexible graduated contractual arrangements. These employees could draw their pensions but be engaged on different terms where they work shorter days or less days or are

called in for specific work projects. The idea is similar to retained forces personnel or emeritus professorial staff in universities. These staff could then also be used to mentor younger engineers/scientists to manage the gap in the 30-45 age range.

Alternatively such employees could be assigned to a general contractor agency and called upon for specific work projects or as temporary cover staff.

d. More work needs to be carried out in schools and on a regular and co-ordinated basis. This would alert school children to the array of jobs and entry points into the sector. It would also help to overcome the issue the sector tends to have of not being “sexy”. [This is more an issue of lack of communication than reality!] One of the more attractive offerings the sector has is relatively high pay and longevity compared with some of the lower paid and seasonal offerings in other sectors.

6.4 Organisational and Human Resource Processes

a. Whilst this report has not focused specifically on non-technical professions (e.g. Finance, HR, Purchasing) or on management there have been indications that some of the same issues exist. Further work needs to be done in up-skilling these professionals and in the area of management development. There are a number of recommendations we would suggest for consideration:-

    - A managerial development track with management qualifications but minimum time away from the workplace may be of benefit to the wider sector. A similar process has been used successfully by Sellafield and the University of Central Lancashire.
    - Higher apprenticeships in the professions should also be considered. Given the small numbers required it may be possible for some sharing of resource and placements
    - Continue/ expand current staff development in conjunction with colleges and universities who already run professionally accredited programmes.

b. A small minority of organisations had full career and succession planning processes. Most organisations said that they were considering developing their career processes. It is recommended that career and succession planning is a key activity in the next 12 months for all organisations. Some of the private sector organisations in this study and the University have expertise in this area along with mentoring and coaching. These resources can be drawn upon if a more collaborative approach is taken.

6.5 Social and Policy

Current and previous government policy has asked the private sector to become more involved in social and educational development along with wider economic development. The recommendations below may fall under the auspices of the LEP or be delegated to the future skills subgroup.

a. Develop a much more co-ordinated sector led approach to schools to include influencing the technical curriculum, helping to improve key skills areas (e.g. English and Mathematics) and working with children at a much earlier age (7-9 year olds) to influence career choice and role model what it is like to work.

b. To take a much more active involvement, with local authority and educational organisations, through Local Economic Partnership groups in the problems of worklessness and NEETS to maximise the available labour market.

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Appendix 1 – Generic Job Roles

Process/Manufacturing Apprentices
Engineering/Maintenance Apprentices
Research and Development Apprentices
Process/Manufacturing Operators
Electrical technicians
Instrument technicians
Mechanical technicians
Laboratory technician
Quality control technician
Fabrication technicians (e.g. welding, mould making etc.)
Electrical engineers
Instrument engineers
Mechanical engineers
Chemical/Process engineers
Chemist (Analytical/Organic/Materials) Graduate +
Materials scientists
Materials scientists PhD
Senior Chemist/Researcher - PhD
Manager - of employees in any of above roles

Appendix 2- Questionnaire

Company name 0

1) How many employees do/will you have in the various generic job roles in the Blackpool/Fylde area?	Staffing - headcount				
Generic job role	Positions/ vacancies currently unfilled	Current **in post** headcount	12 Months time	5 years' time	10 years' time
Process/Manufacturing Apprentices					
Engineering/Maintenance Apprentices					
Research and Development Apprentices					
Process/Manufacturing Operators					
Electrical technicians					
Instrument technicians					
Mechanical technicians					
Laboratory technician					
Quality control technician					
Fabrication technicians (e.g. welding, mould making etc.)					
Electrical engineers					
Instrument engineers					
Mechanical engineers					
Chemical/Process engineers					
Chemist (Analytical/Organic/Materials) Graduate +					
Materials scientists					
Materials scientists PhD					

Senior Chemist/Researcher - PhD					
Manager - of employees in any of above roles					
please add additional generic job roles					

2) Are there any major changes expected that will impact on the number of people you employ? – if so please outline why that is expected
3) Are there specific job roles that you find difficult to fill – if so what do you do currently to deal with the skills gap?
4) Are there any specific skills that are not widely available in your present workforce that you will need in future?
5) Assuming that in the next few years the demand for technical and engineering employees is likely to outstrip supply what do you think can be done to address this problem for businesses in the Blackpool & Fylde area?

6) Of the following personal skills please rate the importance of having this skill at entry point (employment commencement). *Please select from the drop down box, if roles identified in question one were added, please add these onto the last column*

Personal skill	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development Apprentices	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control technician	Fabrication technicians (e.g. welding,	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	(Analytical/Organic/Materials)	Materials scientists	Materials scientists PhD	Senior Chemist/Researcher - PhD	Manager - of employees in any of
Communication (Active listening, reading between the lines, open style with others, able to express yourself to others so you are clearly understood																			
Information Processing Organise and store information so it's easy to find, make meaning from the information worked with, always in the know with the latest information needed for work																			
Working with others Able to gain commitment of others, can persuade people whilst maintaining relationships, get on well with others, able to handle difficult situations involving differences of opinion																			
Organisational Skills Able to prioritise, to anticipate problems before they arise, organise work timetable effectively.																			
Completing and controlling Identify and use the best ways to get work done, deliver what is needed to required quality standards, keep their work on track and to plan																			
Reviewing and evaluating Get feedback from others without being prompted on how work is going, look for root causes rather than quick fixes, take time out to reflect on how things have gone																			
Decision making Able to make decisions easily, make decisions based on information and facts to hand, able to use headroom for decisions to the full.																			
Personal development Know what their learning needs are, can clearly manage their own learning without waiting for the boss to, find it easy to acquire new skills in all areas of their work.																			
Personal management Can assert themselves when the situation arises, they have an objective view of their strengths and weaknesses; they personally feel they can control their work.																			
Ideas for improvement Able to take initiative in suggesting ideas, positive in the face of change and ambiguity, can easily turn ideas into action.																			

7) Please select the most appropriate response for each generic role from the drop down boxes - *we appreciate that there may be more than one response applicable, please hose the most important*																				
Skill/Behaviour	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development Apprentices	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control technician	Fabrication technicians (e.g. welding,	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	(Analytical/Organic/Materials)	Materials scientists	Materials scientists PhD	Senior Chemist/Researcher - PhD	Manager - of employees in any of	OFFICE USE ONLY
Acts to ensure that others will understand complex information																				1
Acts to preserve longer term business or work relations																				2
Acts to tie up loose ends or unresolved issues																				3
Anticipates the consequences of different courses of action																				4
Breaks a complex problem or task down into manageable pieces																				5
Calculates the impact and tailors own action or communication to suit particular groups/individuals																				6
Carefully prepares for key events, presentations and meetings																				7
Checks to ensure that data is accurate and sustainable																				8
Communicates clearly & concretely the results to be achieved & tasks to be done																				9
Demonstrates concern about own professional reputation/credibility with others																				10
Develops a plan that contains a logical sequence of events																				11
Develops and uses clear criteria for guiding actions and decisions																				12
Does research to master details germane to the business or other strategy																				13
Establishes clear focus and direction for own unit																				14
Identifies key factors or issues in																				1

a complex problem or situation																			5
Identifies the decision takers and other critical people to be convinced																			16
Influences and shapes the other party's expectations																			17
Judge's or makes inferences about the other party's interests or concerns																			18
Judges and makes inferences about the other's emotional state or way of thinking																			19
Keeps focus of activities on key objectives																			20
Makes a connection or notes pattern between facts or events not readily obvious																			21
Puts forward well worked-out proposals to superiors																			22
Questions basic premises/assumptions about business, goals, purposes, markets.																			23
Sees initiative and change as part of own responsibility																			24
Sees things from the point of view of others																			25
Sets specific goals for self and others																			26
Spots and takes action on opportunities																			27
Switches tactics in order to convince others																			28
Tailors influence strategy to the needs of key individuals and groups																			29
Take action before being asked or forced to by events																			30
Understands the unspoken meaning in a situation																			31
Uses a conceptual framework/broad perspective to relate the issues to bigger picture																			32

8) Of the following tasks please rate the relevance of undertaking this task for each generic job role - please assume a worker with less then three years' experience in role. Please select from the drop down box, if roles identified in question one were added, please add these onto the last column

Task	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technicians	Quality control technicians	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	Materials scientists (Analytical/Organic/Inorganic)	Materials scientists	Chemist/Researcher	Managers or employees in any of the
Preparation for &/or conclusion of manufacturing operations																	
Controlling manufacturing operations																	
Producing products																	
Handover of manufacturing operations																	
Receive & Check incoming materials																	
Transferring materials																	
Analysing results of inspection																	
Precision measurement																	
Statistical process control																	
Assess workflow/work progress monitoring																	
Managing inventory /stock control																	
Understanding production materials																	
Process assessment																	
Trouble shooting processes																	
Measurements / estimations																	
Preparing equipment																	
Testing performance of equipment																	
Manufacturing planning																	
Investigating/ solving production problems																	
Ordering materials																	
Work sequencing																	
Requirements capturing / researching																	
Using & communicating technical information																	
Monitor & control manufacturing processes																	
Ability to read & interpret manufacturing documentation																	
Lean manufacturing																	
Assembly																	
Clean room control																	
Calibrate instruments																	
Budgetary Control																	

Safety																		
Quality control																		
Maintaining standards																		
Dealing with hazards																		
Supervising work																		
Supervising people																		
Interpreting engineering data & documentation																		
Producing moulds /plastic injection																		
Casting & metalwork																		
Using CAD/ Engineering drawings																		
Aircraft detail fitting activities																		
Installing aircraft mechanical fasteners																		
Handover of maintenance / installation activities																		
Fault location in systems/equipment																		
Maintenance of systems/equipment																		
Determine feasibility of repair																		
Prepare equipment																		
Prepare research on prior designs																		
Make recommendations on designs																		
Analyse drawings (CAD)																		
Ordering tools																		
Robotics																		
Precision measurement																		
Use of hand tools																		
Exploit new / advanced technology & development																		
Conducting experiments and tests to identify the chemical composition and reactive properties of substances and processed materials																		
Analysing and conducting research to develop theories, techniques and processes, and testing the reliability of outcomes under different conditions																		
Developing practical applications of experimental and research findings																		

Assessing formulations and alternative raw materials.																			
Redeveloping the industrial process to improve yield, or plant/production efficiency																			
Analysing reactions, synthetic sequences and purification techniques																			
Laboratory and pilot scale analysis/operations																			
Product development/transfer to full-scale production.																			
Line trials of developmental products																			
Research design & development of engineering solutions																			

9) Please tell us if there are other tasks that have not been listed and are CRITICAL to each generic job role - please try and describe the task in generic terms where possible

Additional Task	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control	Electrical engineers technicians (e.g.	Instrument engineers	Mechanical engineers	Chemical/Process	(Analytical/Organic/M	Materials scientists	Chemist/Researcher - Materials scientists	employees in any of
Example: Create requirement documentation				*x*		*x*											

10) Please tell us what internal career planning / development processes are currently adopted. Please be sure to include the key personnel involved in your processes.

11) Please tell us what the minimum qualifications that you ask for when recruiting the following roles

Job Role	Qualifications required at entry point - if none are required please say "N/A"
Process/Manufacturing Apprentices	

Engineering/Maintenance Apprentices	
Research and Development Apprentices	
Process/Manufacturing Operators	
Electrical technicians	
Instrument technicians	
Mechanical technicians	
Laboratory technician	
Quality control technician	
Fabrication technicians (e.g. welding, mould making etc.)	
Electrical engineers	
Instrument engineers	
Mechanical engineers	
Chemical/Process engineers	
Chemist (Analytical/Organic/Materials) Graduate +	
Materials scientists	
Materials scientists PhD	
Senior Chemist/Researcher - PhD	
Manager - of employees in any of above roles	
Other - please specify	

Thank you for completing the questionnaire.
Please ensure you "save as" before exiting.
once you have completed the questionnaire, please email it as an attachment to:

Appendix 3 – Claimant Count

Claimant count (seeking job seekers allowance and National Insurance credits at job centre plus offices)

	Benefit claimants	% of population	Movement in year
Fylde	1032	2.2%	Up 4.9%
Blackpool	1652	2.5%	Down 1.4%
Wyre	6096	6.8%	Up 0.5%

By Wards

Fylde	
Fylde central	4.9%
Wyre	
Mount	5.0%
Pharos	7.7%
Rossell	5.1%
Blackpool	
Bloomfield	15.6%
Brunswick	9.5%
Claremont	15.1%
Clifton	6.7%
Hawes Side	5.8%
Ingthorpe	5.1%
Park	8.8%
Talbot	11.6%
Tyldesley	6.3%
Victoria	7.9%
Warbreck	6.4%
Waterloo	8.4%

Appendix 4 – Technical Skills

KEY		Essential
		Desirable

Task	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development Operators	Process/Manufacturing	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control technician	Fabrication technicians (e.g. welding, mould	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	Chemist (Analytical/Organic/Mate	Materials scientists	Materials scientists PhD	Senior Chemist/Researcher -	Manager - of employees in any of above roles
	4	4	2	4	3	2	2	3	4	2	3	3	3	4	3	2	2	4	4
Preparation for &/or conclusion of manufacturing operations	3	2	0	6	1	1	0	1	1	0	2	2	1	4	2	0	2	4	5
Controlling manufacturing operations	3	1	0	6	1	1	0	1	1	0	2	2	2	4	2	0	2	4	5
Producing products	4	3	0	6	1	1	0	1	2	2	2	2	2	6	3	0	2	4	4
Handover of manufacturing operations	4	3	0	6	1	1	0	1	2	0	2	2	2	4	2	0	2	4	5
Receive & Check incoming materials	3	3	1	7	2	2	1	2	4	1	4	4	4	6	6	1	4	6	6
Transferring materials	3	3	1	6	2	2	1	2	3	1	3	3	3	4	3	1	3	5	5
Analysing results of inspection	3	3	1	6	2	2	1	5	4	1	3	3	3	5	5	1	3	5	5
Precision measurement	3	3	1	2	2	2	1	2	7	1	3	3	3	5	3	1	3	3	3
Statistical process control	1	2	0	2	1	1	0	1	3	0	2	2	2	4	2	0	2	2	2
Assess workflow/work progress monitoring	2	2	1	4	2	2	1	2	3	1	3	3	3	4	3	1	3	5	5
Managing inventory /stock control	2	1	1	4	2	2	1	3	2	1	3	3	3	3	4	1	3	5	5
Understanding production materials	3	3	1	7	2	2	1	4	4	1	3	3	3	5	5	1	3	5	5
Process assessment	2	3	1	4	2	2	1	4	3	1	3	3	3	5	4	1	3	5	5
Trouble shooting processes	2	2	1	4	3	2	1	3	3	1	4	3	3	5	4	1	3	5	5
Measurements / estimations	2	1	1	3	2	2	1	3	3	1	3	3	3	5	3	1	3	3	5
Preparing equipment	3	3	1	4	3	2	1	4	5	1	3	3	3	5	5	1	3	5	5
Testing performance of equipment	2	3	1	5	4	2	1	2	6	1	5	3	3	5	5	1	3	5	5

Manufacturing planning	2	1	1	5	2	1	1	2	2	0	2	3	2	4	2	0	2	2	5
Investigating/ solving production problems	3	3	0	4	1	1	2	3	3	2	3	3	3	5	5	1	3	5	6
Ordering materials	2	1	1	4	2	1	1	2	3	1	3	3	3	4	4	1	3	5	5
Work sequencing	3	2	1	3	2	1	1	2	3	1	3	3	3	4	3	1	3	3	3
Requirements capturing / researching	2	2	1	2	2	2	0	1	2	0	2	4	2	4	3	0	2	4	4
Using & communicating technical information	3	2	0	3	1	1	0	2	4	1	3	3	3	6	5	1	3	5	5
Monitor & control manufacturing processes	3	4	0	4	3	1	0	1	2	0	2	2	4	5	3	0	2	4	5
Ability to read & interpret manufacturing documentation	3	3	0	5	1	1	1	1	2	0	3	3	3	5	3	1	3	3	5
Lean manufacturing	2	3	0	6	2	2	2	2	3	1	3	2	3	4	2	0	2	2	4
Assembly	1	2	1	2	2	4	2	1	1	0	2	4	2	3	2	0	2	2	3
Clean room control	1	1	0	2	1	4	2	1	3	0	2	2	2	3	2	0	2	2	2
Calibrate instruments	1	1	0	1	1	4	2	1	2	0	3	3	3	2	3	1	3	5	5
Budgetary Control	1	2	0	3	1	2	0	1	2	1	4	4	4	4	3	2	2	4	4
Safety	8	5	2	7	4	3	3	4	7	3	6	4	6	7	5	2	3	7	7
Quality control	6	4	4	6	3	3	4	5	7	3	6	6	6	6	2	2	3	5	5
Maintaining standards	7	5	3	6	5	4	3	5	7	3	6	4	6	6	4	4	4	6	6
Dealing with hazards	3	4	1	6	5	1	2	5	7	1	5	5	3	3	3	3	3	5	5
Supervising work	1	1	1	2	3	1	1	3	2	0	4	5	5	6	3	3	3	3	3
Supervising people	0	1	0	0	2	0	1	0	0	0	1	3	1	3	4	1	1	3	3
Interpreting engineering data & documentation	1	5	0	3	1	2	1	1	2	1	1	2	1	3	3	0	1	3	3
Producing moulds /plastic injection	1	2	1	2	1	2	1	2	1	0	1	4	1	2	1	0	1	3	3
Casting & metalwork	0	1	0	0	1	1	1	0	0	0	1	1	1	2	2	1	2	2	2
Using CAD/ Engineering drawings	0	1	0	1	0	1	1	0	1	1	0	0	0	2	1	0	1	1	1
Aircraft detail fitting activities	0	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0	1	1	1
Installing aircraft mechanical fasteners	0	0	0	0	1	0	0	0	0	0	2	2	2	1	1	1	1	1	1
Handover of maintenance / installation activities	2	2	0	2	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1
Fault location in systems/equipment	2	2	1	2	1	1	1	2	2	1	4	2	2	2	1	1	1	1	1
Maintenance of systems/equipment	2	2	1	3	2	1	1	2	3	1	4	2	2	2	1	1	1	1	1
Determine feasibility of repair	2	2	1	2	2	1	1	2	2	1	4	2	2	3	2	1	1	1	1

Prepare equipment	2	2	1	1	1	2	2	1	1	1	3	1	1	2	1	0	1	1	1
Prepare research on prior designs	0	0	1	0	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0
Make recommendations on designs	0	0	0	0	2	0	0	0	0	0	3	1	1	4	3	1	3	3	3
Analyse drawings (CAD)	0	0	0	1	0	0	0	0	1	1	3	1	1	4	3	1	3	3	3
Ordering tools	0	0	1	1	0	0	0	1	1	1	4	2	2	4	4	2	4	4	4
Robotics	0	0	1	1	0	0	0	1	1	1	1	1	1	3	3	1	3	3	3
Precision measurement	3	3	1	4	1	1	0	2	4	1	3	3	3	6	4	2	4	4	4
Use of hand tools	2	2	1	4	1	1	0	2	4	2	3	1	1	5	3	1	3	3	3
Exploit new / advanced technology & development	0	0	2	0	0	0	0	2	0	0	0	0	0	4	3	1	3	3	3
Conducting experiments and tests to identify the chemical composition and reactive properties of substances and processed materials	1	1	0	1	1	1	0	1	1	0	2	2	2	4	3	1	3	3	3
Analysing and conducting research to develop theories, techniques and processes, and testing the reliability of outcomes under different conditions	1	1	0	1	1	1	0	1	1	0	2	1	2	5	3	1	3	3	3
Developing practical applications of experimental and research findings	1	1	0	1	1	1	0	1	1	0	2	1	2	5	3	1	3	3	3
Assessing formulations and alternative raw materials.	1	1	0	1	1	1	0	1	1	0	2	1	2	4	3	1	3	3	3
Redeveloping the industrial process to improve yield, or plant/production efficiency	1	1	0	1	1	1	0	1	1	0	2	1	2	5	3	1	3	3	3
Analysing reactions, synthetic sequences and purification techniques	1	1	0	1	1	1	0	1	1	0	2	1	2	4	3	1	3	5	5
Laboratory and pilot scale analysis/operations	1	1	0	1	1	1	0	1	1	0	2	1	2	5	3	1	3	5	5
Product development/transfer to full-scale production.	1	1	0	1	1	1	0	1	1	0	2	1	2	5	3	1	3	3	3
Line trials of developmental products	1	1	0	1	1	1	0	1	1	0	4	1	2	4	3	1	3	3	3

Appendix 5 – Personal Skills

KEY		Essential
		Desirable

Personal skill	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control technician	Fabrication technicians (e.g. welding, mould	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	Chemist (Analytical/Organic/Mate	Materials scientists	Materials scientists PhD	Senior Chemist/Researcher -	Manager - of employees in any of above roles		AVERAGE SCORE	RANKING
	3	4	1	5	3	2	2	3	5	1	4	2	1	4	3	1	2	3	4	53		
Communication	4	5	0	8	5	3	3	5	8	1	8	4	2	8	6	1	3	5	8	87	1.64	**3=**
(Active listening, reading between the lines, open style with others, able to express yourself to others so you are clearly understood																				0		
Information Processing	4	5	0	7	4	3	3	5	8	1	8	4	2	8	6	2	4	6	8	88	1.66	**2**
Organise and store information so it's easy to find, make meaning from the information worked with, always in the know with the latest information needed for work																				0		
Working with others	3	5	0	8	4	2	3	5	8	1	8	4	2	8	6	2	4	6	8	87	1.64	**3=**
Able to gain commitment of others, can persuade people whilst maintaining relationships, get on well with others, able to handle difficult situations involving differences of opinion																				0		
Organisational Skills	2	3	0	6	4	2	3	5	8	1	8	4	2	8	6	2	4	6	8	82	1.55	**6**
Able to prioritise, to anticipate problems before they arise, organise work timetable effectively.																				0		

Completing and controlling	3	5	1	8	5	3	3	5	8	1	8	4	2	8	6	2	4	6	8	90	1.70	**1**
Identify and use the best ways to get work done, deliver what is needed to required quality standards, keep their work on track and to plan																				0		
Reviewing and evaluating	3	5	1	5	4	2	3	5	8	1	8	4	2	8	6	2	4	6	8	85	1.60	**5**
Get feedback from others without being prompted on how work is going, look for root causes rather than quick fixes, take time out to reflect on how things have gone																				0		
Decision making	2	2	0	4	4	2	3	4	7	1	8	4	2	8	6	2	4	6	8	77	1.45	**8**
Able to make decisions easily, make decisions based on information and facts to hand, able to use headroom for decisions to the full.																				0		
Personal development	4	5	1	6	4	2	3	4	7	1	7	3	2	7	5	2	3	5	8	79	1.49	**7**
Know what their learning needs are, can clearly manage their own learning without waiting for the boss to, find it easy to acquire new skills in all areas of their work.																				0		
Personal management	2	3	1	4	3	2	2	4	5	1	6	3	2	8	5	2	4	5	8	70	1.32	**9**
Can assert themselves when the situation arises, they have an objective view of their strengths and weaknesses; they personally feel they can control their work.																				0		
Ideas for improvement	3	4	1	4	2	2	1	2	4	0	4	3	2	5	4	2	4	5	8	60	1.13	**10**
Able to take initiative in suggesting ideas, positive in the face of change and ambiguity, can easily turn ideas into action.																						

Appendix 6 – Behaviours

Skill/Behaviour	Process/Manufacturing Apprentices	Engineering/Maintenance Apprentices	Research and Development	Process/Manufacturing Operators	Electrical technicians	Instrument technicians	Mechanical technicians	Laboratory technician	Quality control technician	Fabrication technicians (e.g. welding, mould	Electrical engineers	Instrument engineers	Mechanical engineers	Chemical/Process engineers	Chemist (Analytical/Organic/Mate	Materials scientists	Materials scientists PhD	Senior Chemist/Researcher -	Manager - of employees in any of above roles
responses to job	3	4	1	4	3	2	1	3	4	1	3	2	2	3	3	1	2	3	3
Acts to ensure that others will understand complex information	2	2	1	4	4	2	1	4	5	1	6	4	4	6	6	2	4	6	6
Acts to preserve longer term business or work relations	2	4	1	6	4	2	1	5	7	1	6	4	4	6	6	2	4	6	6
Calculates the impact and tailors own action or communication to suit particular groups/individuals	3	4	1	5	4	2	1	4	6	1	6	4	4	6	6	2	4	6	6
Demonstrates concern about own professional reputation/credibility with others	4	6	2	7	5	3	2	5	6	2	6	4	4	6	6	2	4	6	6
CONCERN FOR IMPACT	**0.9**	**1.0**	**1.3**	**1.4**	**1.4**	**1.1**	**1.3**	**1.5**	**1.5**	**1.3**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**2.0**
Anticipates the consequences of different courses of action	3	4	1	5	3	2	1	5	7	1	6	4	4	6	6	2	4	6	6
Breaks a complex problem or task down into manageable pieces	3	4	1	4	3	2	1	5	7	1	6	4	4	6	6	2	4	6	6
Develops and uses clear criteria for guiding actions and decisions	1	1	1	3	4	2	1	3	3	1	6	4	4	6	5	2	4	5	5
Develops a plan that contains a logical sequence of events	2	3	1	4	4	2	1	4	6	1	6	4	4	6	5	2	4	5	5
ANALYTICAL THINKING	**0.8**	**0.8**	**1.0**	**1.0**	**1.2**	**1.0**	**1.0**	**1.4**	**1.4**	**1.0**	**2.0**	**2.0**	**2.0**	**2.0**	**1.8**	**2.0**	**2.0**	**1.8**	**1.8**
Carefully prepares for key events, presentations and meetings	3	3	2	3	3	3	2	6	7	2	6	4	4	6	6	2	4	6	6
Checks to ensure that data is accurate and sustainable	5	7	2	7	5	3	2	6	8	2	6	4	4	6	6	2	4	6	6
Acts to tie up loose ends or unresolved issues	3	3	1	5	4	2	1	4	6	1	6	4	4	6	6	2	4	6	6
Does research to master details germane to the business or other strategy	0	0	0	1	2	2	1	2	5	1	3	3	3	4	3	1	3	5	5
THOROUGHNESS	**0.9**	**0.8**	**1.3**	**1.0**	**1.2**	**1.3**	**1.5**	**1.5**	**1.6**	**1.5**	**1.8**	**1.9**	**1.9**	**1.8**	**1.8**	**1.8**	**1.9**	**1.9**	**1.9**
Communicates clearly & concretely the results to be achieved & tasks to be done	5	7	2	7	5	3	2	5	7	2	6	4	4	6	6	2	4	6	6
Keeps focus of activities on key objectives	3	4	1	4	2	2	1	2	2	1	5	3	3	5	5	1	3	5	5

Sets specific goals for self and others	2	4	1	5	4	2	1	4	4	1	6	4	4	6	6	2	4	6	6
Establishes clear focus and direction for own unit	1	1	0	2	3	2	1	4	5	1	5	3	3	5	5	1	3	5	5
RESULTS ORIENTATION	**0.9**	**1.0**	**1.0**	**1.1**	**1.2**	**1.1**	**1.3**	**1.3**	**1.1**	**1.3**	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.5**	**1.8**	**1.8**	**1.8**
Sees things from the point of view of others	3	4	2	6	4	3	2	3	5	2	5	4	4	5	5	2	4	6	6
Understands the unspoken meaning in a situation	2	2	1	3	2	2	1	2	3	1	3	3	3	4	3	1	3	3	3
Judge's or makes inferences about the other party's interests or concerns	2	1	1	2	2	2	1	2	3	1	4	4	4	5	4	2	4	6	6
Judges and makes inferences about the other's emotional state or way of thinking	0	1	0	2	1	1	0	1	2	0	3	3	3	4	3	1	3	5	5
INTERPERSONAL AWARENESS	**0.6**	**0.5**	**1.0**	**0.8**	**0.8**	**1.0**	**1.0**	**0.7**	**0.8**	**1.0**	**1.3**	**1.8**	**1.8**	**1.5**	**1.3**	**1.5**	**1.8**	**1.7**	**1.7**
Identifies key factors or issues in a complex problem or situation	2	2	1	3	2	2	1	4	3	1	6	4	4	6	6	2	4	6	6
Uses a conceptual framework/broad perspective to relate the issues to bigger picture	0	0	0	1	2	2	1	3	3	1	4	3	3	4	5	1	3	5	5
Makes a connection or notes pattern between facts or events not readily obvious	1	1	1	3	2	2	1	2	4	1	3	3	3	5	3	1	3	3	4
Questions basic premises/assumptions about business, goals, purposes, markets.	0	1	0	2	3	2	1	3	4	1	4	3	3	4	4	1	3	5	5
CONCEPTUAL THINKING	**0.3**	**0.3**	**0.5**	**0.6**	**0.8**	**1.0**	**1.0**	**1.0**	**0.9**	**1.0**	**1.4**	**1.6**	**1.6**	**1.6**	**1.5**	**1.3**	**1.6**	**1.6**	**1.7**
Puts forward well worked-out proposals to superiors	1	1	1	3	2	2	1	2	5	1	3	3	3	5	3	1	3	5	5
Take action before being asked or forced to by events	4	6	2	7	5	3	2	5	7	2	6	4	4	6	6	2	4	6	6
Sees initiative and change as part of own responsibility	3	4	2	5	4	3	2	4	6	2	5	4	4	6	5	2	4	6	6
Spots and takes action on opportunities	2	4	1	4	4	2	1	4	4	1	6	4	4	6	6	2	4	6	6
INITIATIVE	**0.8**	**0.9**	**1.5**	**1.2**	**1.3**	**1.3**	**1.5**	**1.3**	**1.4**	**1.5**	**1.7**	**1.9**	**1.9**	**1.9**	**1.7**	**1.8**	**1.9**	**1.9**	**1.9**
Influences and shapes the other party's expectations	2	1	1	2	2	2	1	2	3	1	4	4	4	5	4	2	4	4	4
Identifies the decision takers and other critical people to be convinced	2	2	1	3	2	3	1	2	3	1	4	4	4	6	4	2	4	4	4
Switches tactics in order to convince others	3	4	1	4	3	2	1	3	4	1	5	4	4	6	6	2	4	6	6
Tailors influence strategy to the needs of key individuals and groups	0	1	0	2	2	1	0	2	3	0	4	3	3	4	5	1	3	5	5
STRATEGIC INFLUENCING	**0.6**	**0.5**	**0.8**	**0.7**	**0.8**	**1.0**	**0.8**	**0.8**	**0.8**	**0.8**	**1.4**	**1.9**	**1.9**	**1.8**	**1.6**	**1.8**	**1.9**	**1.6**	**1.6**

KEY		Essential
		Desirable

Appendix 7 – Job Numbers

KEY		Critical
		Other key roles

Generic job role	Positions/ vacancies currently unfilled	Current **in post** headcount	12Months time	5 years' time	10 years' time
Process/Manufacturing Apprentices	5	5	10	10	10
Engineering/Maintenance Apprentices	4	22	23	34	40
Research and Development Apprentices	0	0	0	0	0
Process/Manufacturing Operators	8	846	849	848	848
Electrical technicians	1	11	11	13	13
Instrument technicians	1	7	8	8	8
Mechanical technicians	0	38	38	40	40
Laboratory technician	0	53	53	54	54
Quality control technician	2	28	34	30	30
Fabrication technicians (e.g. welding, mould making etc.)	0	11	11	11	11
Electrical engineers	2	47	47	61	61
Instrument engineers		23	23	25	25
Mechanical engineers		13	13	23	23
Chemical/Process engineers	0	7	7	7	7
Chemist (Analytical/Organic/Materials) Graduate +	0	75	75	75	75
Materials scientists		13	13	16	16
Materials scientists PhD		21	21	21	21
Senior Chemist/Researcher - PhD	3	2	2	2	2
Manager - of employees in any of above roles	0	246	223	225	225

Appendix 8 – Funding

EOS – Employment Ownership of Skills Fund

This is a government funded competitive scheme designed for employers to boost investment in their current and future workforce. Applications must demonstrate how their bid will raise skill levels, create jobs and drive enterprise/economic growth. A good example of this scheme is the joint work by the sector skills council for manufacturing Semta and the Engineering Employers' Federation working with leading employers to combat the issue of replacement of older workers with new young skilled staff.

AMSCI - Advanced Manufacturing Supply Chain Initiative

This competitive funding scheme was designed by the Department for Business Innovation and Skills (BIS) with the intention of supporting global competitiveness through innovative projects where the UK is well placed to be the global leader. This will see the relocation of parts of the supply chain move to England (not a UK initiative).

RGF - Regional Growth Fund

RGF programmes are run by organisations that have been awarded cash to offer grants and loans to businesses. There is around £800M available to SMEs through such RGF programmes. Grants and/or loans are made against the following criteria:-

- Businesses need to be based in a specific location
- Businesses need to work in a specific sector
- Businesses need to work on specific projects

The funds are specifically designed to help SME businesses grow/consolidate, create or protect jobs, invest in capital.