



Demographic change, age management and competencies in light of the challenges facing the European Gas sector

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Chapter 1

Introduction¹

The average age of European citizens is increasing and this means that in the future there will be less people of working age to support an expanding number of retirees. This has direct implications for the European labour market as there will be a shortage of workers to fill vacancies as older workers retire, which in turn will slow down growth and the region's competitiveness. Although this trend is irreversible, the scale of its impact can be, and must be, lessened. But this will require big changes in societies by individuals, employers, governments and education providers and these changes are needed now. This study seeks to identify how demographic change might impact upon the European gas sector, in terms of the future size, profile and competencies of the gas workforce, and to put forward recommendations for the social partners to limit its negative impact.

The social partners within the European gas sector support the work of the European Commission by undertaking regular social dialogue, through their formalised, cross-industry Social Dialogue Committee. In 2008 the social partners signed their first common declaration on a study carried out by ECOTEC, which examined the impact on employment within the EU25 as a result of the opening of the electricity and gas markets. In addition the social partners have reached an agreement on violence within the sector. This study, focusing on demographic change, forms the latest joint venture between the two parties. This study focuses on the impact of Europe's ageing workforce on skills and competences and, more specifically, the impact on skills of the ageing workforce within the European gas industry itself. It is clear that changing demographics present governments, companies and trade unions with challenges as well as opportunities. These challenges, if not properly tackled, will grow in significance to such an extent that the competitiveness, and indeed the viability of the European gas sector, will be at risk. On the other hand opportunities exist for gas companies and their workforces to reshape their industry and to ensure its long term survival, at a time when the European Commission and national governments are seeking to support this endeavour. Although it is impossible to predict the future and to precisely gauge the numbers of workers required to replace those retiring, changing sectors, retraining, being recruited or made redundant due to changes in the industry, populations and ageing, it is

¹ This document has been prepared with the financial support of the European Commission. However, the Commission is not responsible for its contents or the use that may be made of it.

nevertheless a very good idea to begin discussions ahead of change and to ensure that the social partners within the gas sector are able, to the best of their ability, to play a positive role in supporting the development of the sector and ensuring its long term survival. Obviously, the better prepared the social partners are, the smoother the transition through what will undoubtedly be a fast changing, and sometimes unpredictable, two decades ahead.

Monitoring the age profile, and addressing subsequent shortcomings, of a given sector is important to ensure there is a continual movement between younger people gaining new skills within an emerging career path, and knowledge transfer at the other end of the age spectrum. This will ensure that the sector has a constant flow of adequately trained professionals who then later pass on their knowledge to new recruits entering the sector, completing the cycle. Of course individuals in Europe are aware of the changing nature of work and that a job is rarely for life. However a company which develops people throughout their working life, at any age and at any level within the organisation is better placed to deal with changes in consumer demand by having the necessary skills and flexibility in place to enable them to adapt their business accordingly. An ageing population throws up important issues that need to be thoroughly considered by the social partners. For instance fewer young people entering the labour market will mean that companies will have to compete more to recruit younger workers and, particularly if they then cannot retain them, recruitment and training costs will rise. At the same time as older and more experienced workers retire skills will be lost, and these 'lost knowledge costs' will also tend to reduce company and industry competitiveness.

What this study cannot do is to predict the entire range of skills necessary by all European gas companies, and the measures they need to take to ensure their long term survival, faced with demographic change, climate change and the future educational attainment of citizens. What this study is able to do is to evaluate the current trends within and without the sector across Europe, and to compare these with the sector's needs so as to offer the social partners some recommendations for implementation to ensure the future success of the sector. The next section of this study will explain the nature of demographics within Europe in greater detail, place this phenomenon within Europe's employment policies and outline its potential impact for European employers and their workforces.

Chapter 2

Europe's ageing population and its effects on the European labour market

Due to better healthcare, lower mortality and fertility rates the average age of the European citizen is rising. The European Commission predicts that by 2020 the employment rate across the EU27 will begin to decrease as Europe suffers from a shortage of labour resulting in lower economic growth and prosperity while national governments struggle to meet the cost of caring for retirees due to lower tax revenues of a smaller working population. The issue of the ageing European population is already a serious one and is given specific attention by the European Commission, national governments, employers and trade unions. The impact will be felt, to various degrees, by all European nations and it is in the interests of all of Europe's citizens for governments and the social partners to examine and understand the challenge posed by this phenomenon in order to provide solutions to this irreversible trend. Naturally finding solutions in the workplace is central to tackling this problem and, due to its scale, employers and trade unions need to work jointly to maximise their efforts in order to radically alter the traditional employment landscape.

In 2007 the European Commission produced its first demography report, "Europe's Demographic Future: Facts and Figures", and demographic change is now high on the European policy agenda, not least because in the very near future the baby boom cohort (born between 1945 and 1965) will begin to retire from the labour market. The retirement of this group of workers will bring about a shift in the balance between the active and the retired resulting in a greater dependency upon health care by a large portion of the population in the next 15-20 years. In addition, and as a result of reduced fertility rates, young cohorts entering the labour market will be far smaller. As a result the European Commission predicts that within the next decade total employment in the EU could begin to fall, despite rising employment rates². In its document titled "*The demographic future of Europe – from challenge to opportunity*" (adopted in October 2006) followed by its Green Paper "*Confronting demographic change*", the European Commission has suggested five key areas for further work:

² European Commission "Europe's Demographic Future: Facts and Figures" (2007)

- Promoting demographic renewal in Europe
- Promoting employment in Europe – more jobs and longer working lives of better quality
- A more productive and dynamic Europe
- Sustainable public finances to guarantee adequate social protection and equity between the generations

In addition there has been a number of Commission communications and policy documents aimed at increasing the participation rates of Europe’s population, these include:

- Communications on Disabled workers, making work pay and social inclusion (2003; 2004)
- Legislation on anti-discrimination measures (Treaty of Amsterdam 1999; Treaty of Nice 2003; Racial discrimination and equal treatment Directive 2000)
- Community Lisbon Programme (2005)
- Lisbon strategy (2000)
- European Employment Strategy (Luxembourg Process 1997)

The European Commission and work

At this point in the report it is worth highlighting the expectations from the European Commission on the future of work generally and how it seeks to ensure quality employment by promoting internal flexibility and smooth transitions in the labour market as an essential part of the solution:

‘It is not enough only to get people into work, but it is also important to provide them sufficient facilities to learn new skills and competences and to assist them in critical transitions during their working life and climbing job ladders. Without quality dynamics, employment creation remains below its potential.’³

The discussion around the concept of a ‘good job’ (both in terms of satisfaction and working conditions) has intensified since the Lisbon Summit, in which the focus has been directed

³ European Commission, “Enhancing higher productivity and more and better jobs, including for people at the margins of the labour market” (2007)

clearly towards employment and work productivity issues and their interactions, with due regard for the European Social Agenda. On the basis of the above developments, and specifically referring to the characteristics of a job, which make it satisfying for the worker, a good quality job can be defined as a job that:

- provides appropriate levels of income
- offers opportunities for skill developments, life-long learning and career progression
- ensures safe and healthy working conditions
- combines the flexibility in working organisation with employment security
- allows for the reconciliation of work and family life, and
- provides diversity and ensures equal opportunities and non-discrimination⁴
- The trade unions within the European Gas sector state that a good quality job is one that ought to include adequate retirement provisions.

Clearly the attractiveness of a job has a direct positive correlation with its demand among job seekers, but it is also positively linked to retention, both in terms of staying with an employer and delaying retirement. Naturally issues such as working time, work organisation and employee involvement all play an important role in determining job attractiveness and ought to be fully considered by employers seeking to retain staff.

An important part of the renewed Lisbon Agenda is that the reforms for growth and jobs ought to be achieved by building partnerships at all levels – from the European level, to national, local and community. Employers, trade unions, and their associations, need to create partnerships to help drive change through companies and their workforces.

A report for the European Commission⁵ suggests that there will be a shift in demand towards workers with higher education levels, and these will be primarily due to:

1. A shift across all sectors of the economy to activities requiring higher skill levels and a greater number of years spent in education, with particular emphasis on high-skill business activities, health care, education, and jobs requiring general managers,

⁴ Ibid

⁵ Alphametrics, “The implications of demographic trends for employment and jobs” (2005)

professionals and technicians. The report also suggested that there would be decline in the demand for lower skilled occupations.

2. Occupational shifts within sectors, requiring more managers and jobs requiring relatively high levels of education, reflecting greater automation and intellectual ‘knowledge based’ occupations.
3. A general increase in the educational levels of those performing particular jobs – i.e. a shift within occupations towards those with tertiary and upper secondary education and away from those with only basic schooling. This is supported by the fact that those workers with lower educational attainment tend to have lower labour force participation rates than those with higher education.

Europe’s ageing population

The average age of the world’s population is rising. This phenomenon is a result of two factors – a reduction in age-specific mortality (longer lives) and a reduction in fertility rates (fewer births). In Europe, although the total population will remain broadly stable⁶, during the next 40 years the average age of the EU citizen will rise by 10 years – from 38 to 48⁷. The proportion of people living to over 60 in Europe is growing at two million a year, and is predicted to do so at this rate for the next 25 years. Over the coming decades, due to population ageing, the number of people retiring will rise significantly relative to those of working age, moving from 4 to only 3 persons of working age for every retired person. We will therefore risk witnessing a situation where there will be insufficient numbers of economically active adults to maintain current employment rates and current economic growth, not to mention difficulties faced by European states in relation to pension and healthcare provision. The total population of EU27 is projected to remain stable, although the population in new member states is predicted to decline by 7.5 million people between 2005 and 2030⁸.

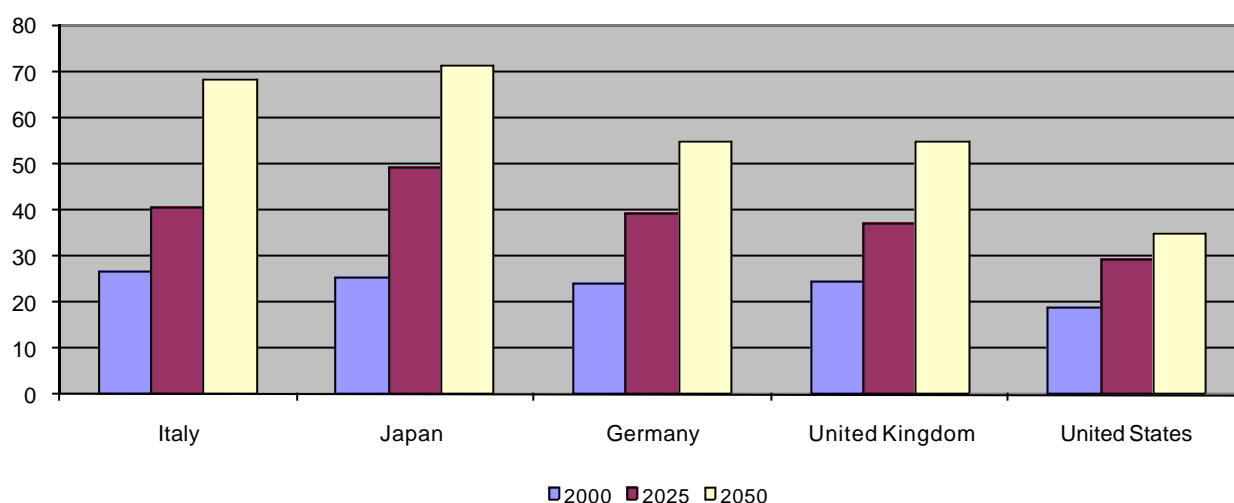
⁶ European Commission, “Europe’s demographic future: facts and figures” (2007)

⁷ Münz, R “Population change and its consequences” (2007)

⁸ Eurostat

One of the key indicators in measuring the extent to which a population is ageing is the *old-age dependency ratio*⁹ which represents those within a population aged 65+ as a percentage of those aged 15-64, which for a number of countries is given in graph 1 below¹⁰. The bars on the graph show how many adults, over the next 40 years, will be aged 64 or over in Italy, Japan, Germany, the United Kingdom and the United States. By 2050 in Italy, for example, the graph shows that the number of adults aged 65 plus will be equal to almost 70 per cent of the number of adults of working age.

Graph 1: Old-age dependency ratio in selected countries 2000-2050



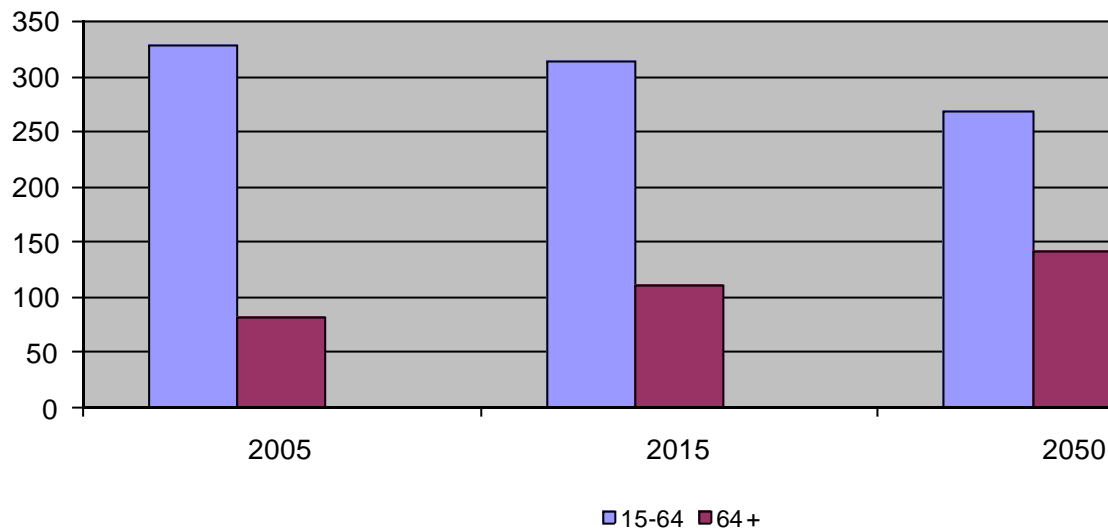
However it should be noted that this measurement does not accurately represent trends in economic dependency for two reasons. First it does not take into account the number of children under 15 years who, by definition, tend to be economically dependent and, second, this measurement fails to take into account the true extent of economic activity – some people aged 15-64 are economically inactive, whereas some aged over 65 are working. However as a general measurement the age-old dependency ratio is helpful in that it allows comparisons to be made and enables the forecasting of future trends.

The graph below illustrates the rising numbers of EU citizens aged 65 and over and the simultaneous reduction in the number of adults of working age over the first half of the 21st century. The graph illustrates that, in 2005, for every 100 Europeans of working age there are approximately 25 retirees and by 2050 this ratio will have changed to 100:53.

⁹ For example, in a country with an *old-age dependency ratio* of 100 per cent there will be as many adults aged 65 plus as there are adults of working age

¹⁰ UK Government “Aspects of the economics of an ageing population” (2003)

Graph 2: Number of adults (millions) in Europe aged 15-64 and over 65



If we examine the ratio between the actual workforce and the older population the picture is starker still. Today in the EU 27 there are 35 people aged 65+ per 100 economically active. By 2050 this ratio will have risen to 75 senior citizens per 100 workers¹¹. This trend will place a strain upon the smaller group of working age people to provide the pension entitlements, health care and other associated services for the expanding number of retirees. Since 1970 there has been a decline in the numbers of men working into their sixties. This is partly “due to involuntary early retirement associated with economic restructuring and partly to the impact of early retirement schemes”¹² that have generally targeted those workers aged between 55-58 years. While this is the general picture, demographic changes are not uniform across all EU member states and candidate countries. For example countries like Ireland and Turkey are witnessing population growth while others, like Poland, Romania and Bulgaria are experiencing population decline¹³.

¹¹ Münz, R “Population change and its consequences” (2007)

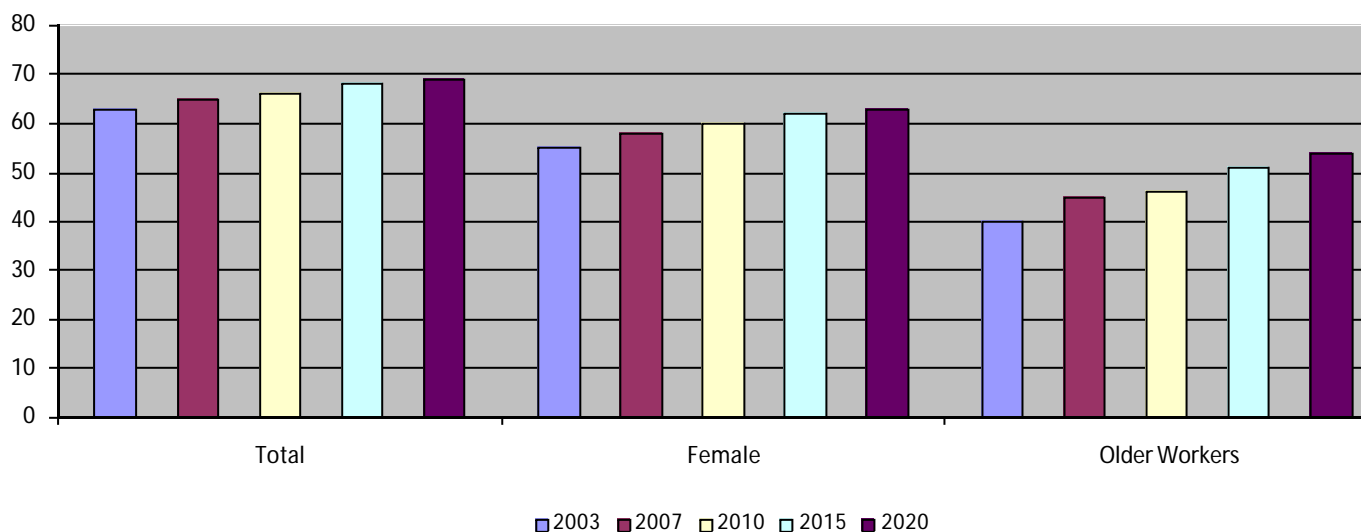
¹² “Increasing labour force participation and promoting active ageing” European Commission (2002)

¹³ Marin and Zaidi “Ageing trends and policies in the European region” cited in ILO publication “Regional dimensions of the ageing situation” (2008)

In addition to movements within countries, it is important to examine those between countries. In recent years European governments have relied upon migrant workers to cure any big deficiencies in the numbers or skills of domestic workers. However, projections from Eurostat show that the net migration¹⁴ in the EU27 countries is set to decrease substantially from 1,683,921 in 2008 to 1,093,105 by 2030, which will result in reduced opportunities for governments and companies relying on inward migration to fill job vacancies. This will mean other tools must be considered to achieve a better match between skills and job vacancies.

Across Europe national governments have sought to plug the gap between the number of workers retiring and the lack of younger adults entering the labour market by increasing the participation rate of women and older workers. The graph below illustrates the movement of these groups of adults into the labour market in the case of women and extending the working life in the case of older workers. As the graph shows this trend is expected to continue throughout the next decade as employers seek to maintain an adequate supply of labour as the average age of the population rises. However this measure, on its own, will be insufficient beyond 2020 as the working population drops below what is required.

Graph 3: Projected employment rates in the EU27 (Source: European Commission)

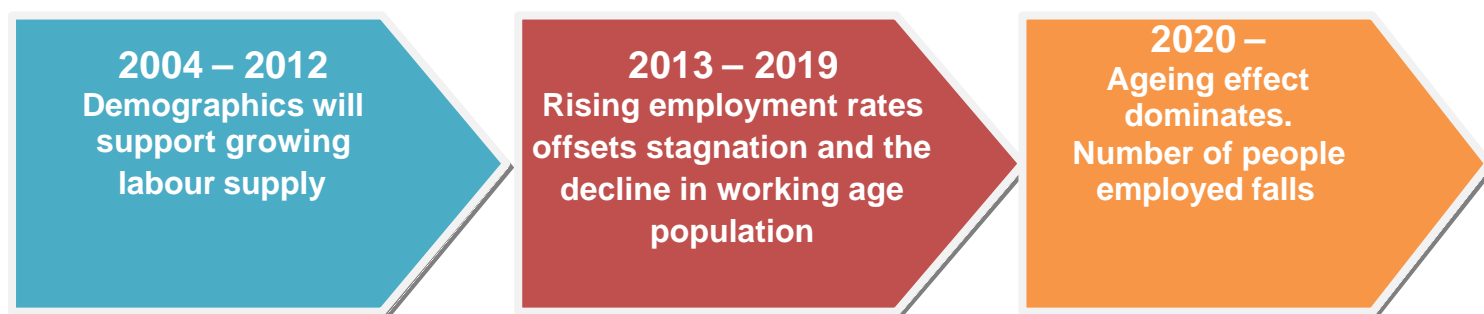


As with all ageing populations there will be fewer younger workers entering the European labour market in the future and this will eventually limit Europe's employment growth. The

¹⁴ Net immigration is calculated as Inward Migration less Outward Migration

European Commission forecasts that up until 2019¹⁵ total employment in Europe will increase due to rising labour force participation, meeting the Lisbon target of 70 per cent by 2020. This will be achieved through a combination of an increase in the numbers of older workers and an increase in the participation rates of women the labour force. However, from 2019 onwards Europe’s shrinking workforce will begin to reduce overall employment, driving down average growth in GDP from its 2.4 per cent average in 2007 to 1.2 per cent for the period 2031 – 2050.

Figure 1: The 3 stages of the effects of Europe’s ageing population



Since the onset of the 2008-9 economic crisis the average economic growth rate has declined below these figures, making the starting point for the economic effects of these demographic pressures (which are largely unchanged) still more serious. Declining economic growth will undoubtedly impact across a number of social spheres, including the ability of member states to offer sustainable pension arrangement, social security protection and long-term health care provision. However, as well as their impact upon general employment levels, these changes will also have a profound impact upon the skills profile of Europe’s workforce.

With few exceptions the employment levels among older workers has declined over the last two decades and this is largely as a result of early retirement schemes which were introduced in the 1980s and 1990s¹⁶. In addition many trade unions and employers have focused on the pension needs of older workers and so have recast the attitudes of employees and employers so that it is accepted that the normal retirement age is 55 in many European states¹⁷. This has radically shaped and influenced the attitudes of employers and employees so that workers in

¹⁵ “New Skills for New Jobs –Anticipating and matching labour market and skills needs”, EC Staff Working Document (2008)

¹⁶ “Employment initiatives for an ageing workforce in the EU15”, European foundation for the improvement of living and working conditions (2006)

¹⁷ ‘France: A country with a deep early exit culture’, Guillemard AM (2004)

their late forties and fifties are not expected to undertake training or development and are merely waiting to retire.

The impact of demographic change on jobs and skills

Europe’s ageing population has implications for its labour markets. If we assume that the figures presented so far in this report stay constant there will be an insufficient number of adults to maintain employment growth - there will be a labour shortage. One way to ensure there is an adequate supply of labour is to increase the participation rate of adults. However this requires an understanding of the issues that prevent people from economic activity and the table below, from European Commission sources, highlights some of the reasons given for the lack of labour market participation in adults of working age.

Table 1: The reasons given by adults for not working

Reasons for not working	%
Personal or family responsibilities	20
Own illness or disability	9
Education and training	27 (nearly 90 per cent in 15-24 group)
Retirement	16 (almost 90 per cent in the 55-64 group)

As the figures suggest governments and employers will need to introduce new policies to ensure these people not working are free to do so and are not constrained by their own personal circumstances and are free to choose to work. The categories ‘education and training’ and retirement’ will be dealt with later in this report.

Current policies being pursued by national governments are aimed at increasing the overall participation rate of adults, and in particular the participation rate of older workers. Currently only 50 per cent of men and 40 per cent of women aged 60 are still in the labour market¹⁸. If participation rates among adults are to be increased then policies will need to focus on this group of workers to a greater extent. If these figures remain constant there will be insufficient numbers of workers to fill vacancies, resulting in lower economic growth and skills shortages. Raising employment rates and skill levels will be crucial as the total European population stagnates and productivity and employment participation become the

¹⁸ “Meeting social needs in an ageing society” European Commission (2008)

most important drivers for future economic growth¹⁹. Increasing the participation rate of adults has been an aim of the European Commission for some time and is a key component of the Lisbon objectives. Forecasts by the European Commission suggest that participation rates for the 15-64 age group will increase in the EU25, rising from 65.5 per cent in 2007 to 69 per cent in 2020 and this rise is mainly due to the increased participation of females, although the increased participation for older workers will also be a factor in this growth²⁰. Raising the participation rates of female adults is a key policy objective of the European Commission and, as female workers are already under-represented within the European gas sector, the recruitment and retention of this group, will significantly help the sector deal with demographic change. We already know that the participation rate of women, between the age of 25 and 60, has grown rapidly since the 1970s while the total participation rates in men have declined²¹.

The European Commission has undertaken work in this area and has identified a number of key areas it considers must be considered in order to improve participation rates, and these are:

- Availability and attractiveness of work
- Balance of financial incentives
- Education and training
- A supportive environment

The overall picture for Europe is that participation rates have risen over the last two decades, from 66 per cent to 69 per cent, however this growth disguises many anomalies within the European labour market and these ought to be highlighted at this point in the report.

- **People aged 15-24**

Although many young people enter the labour market without necessarily giving up on their studies by combining them with work, thereby increasing the participation rate for this age group since the 1980s, many do not. In fact according to the European Commission as many

¹⁹ European Commission, “Enhancing higher productivity and more and better jobs, including for people at the margins of the labour market” (2007)

²⁰ “New Skills for New Jobs –Anticipating and matching labour market and skills needs”, EC Staff Working Document (2008)

²¹ “Increasing labourforce participation and promoting active ageing” EC (2002)

as 8 per cent of those aged 15-19 and more than 40 per cent of those aged between 20 and 24 are in employment only with no corresponding training. This may be addressed by ensuring better access to CVT and lifelong learning and these are currently being tackled by a number of national governments.

- **Prime Age 25-49**

This is the age group in which the European Commission identifies as having changed the most in the last three decades. This group has witnessed a small decline in the participation of men in the labour market but a large increase for women - from under 40 per cent in the 1970s to over 70 per cent today. However there is still a considerable gender gap, which begins to emerge at the start of this age group, for those women with and without children and the participation rates for women change with the age of their children. The table below suggests that employers need to do more to recruit women with children.

Table 2: The labour force participation rates (%) for women according to the age of their children

Status	Participation rate of women %
No Children	72
School age children	65
Pre-school age	59

Female labour market participation tends to be lower in the southern European countries, where there is also little difference with the age of children. Overall these figures suggest that companies seeking to recruit women ought to give consideration to providing services to enable women with children to take up employment opportunities, which may only be possible universally with central government support.

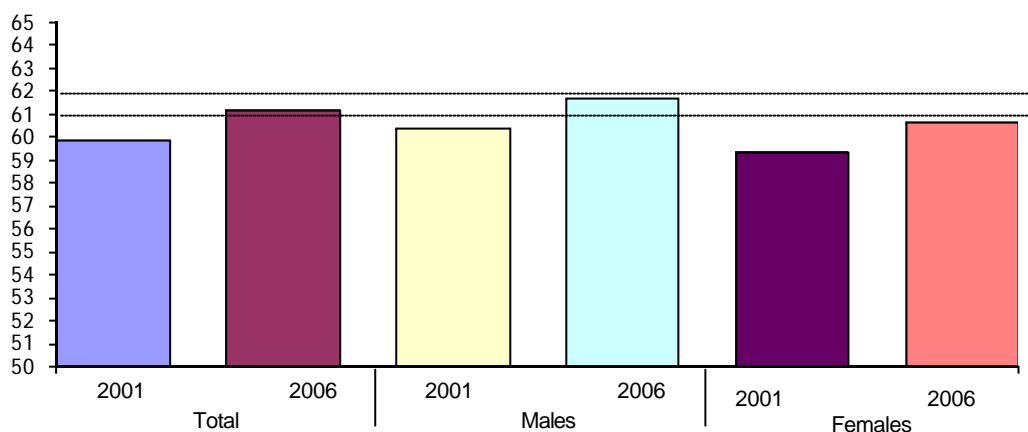
- **Older workers 50-65**

From the age of 50, the participation rate of those men with low skilled manual jobs begins to decline. In 1970 this process did not occur until the age of 60. For women this begins to happen at the age of 45, but the fall is not as rapid as for men. This fall has been historically, and still is, mainly due to early retirement schemes. Training incidence also declines for workers at the age of 50, and for the low skilled the figures are even starker.

Transition into Retirement

The age at which workers leave the labour market is increasing. The graph below highlights the increasing age of retirement and suggests that over the last decade the average EU27 age of retirement, for all workers, has increased from 60 years to over 61 years generally, and to nearly 62 for men. However this small increase over the last five years will be insufficient to deal with the shortage of workers due to the ageing population over the coming decades.

Graph 4: Average age of exit from the labour force across the EU27



There is evidence to suggest that many retired workers would postpone retirement if their employer supported this by introducing more flexible working arrangement. In EU27 in 2006, well over 23 million workers stated that the introduction of more flexible working time arrangements would contribute or would have contributed to them staying longer at work. If employers seek to delay retirement for those workers more able to work, but fail to offer training and a supportive environment then this policy will fail. As Table 3, below, shows workers across the main occupations would consider postponing their exit from the labour market if their employer offered opportunities to train or their workplace was healthier. The figures are particularly interesting for professionals, arguably the group with a working life offering more training than most other occupational groups. Figures for this group suggest that almost 4 per cent of these workers would consider postponing their exit from the labour market if they were given more opportunities to update their skills. For those who would consider staying at work longer if their workplace was healthier, the figure is especially high, perhaps not surprisingly, for those workers in manual occupations.

Table 3: Reasons given by retired workers for not staying at work longer (% of responses)

Issue	El	SM	Cl	S	P
Number of employed persons who would stay longer at work if they could update their skills	2.7	2.8	2.3	2.1	3.8
Number of not employed persons who would have stayed longer at work if their workplace had been healthier and/or safer	3.9	4.9	2	2.5	3.3

Key:

El = Elementary SM = Skilled manual Cl = Clerks S = Service workers, shop and market sales workers
P = Managers, professionals, technicians and associate professionals

There has been a slight change in the age at which people retire across Europe and Table 4 shows the variations between the averages across the EU15 and the changes between 2001 and 2002. The figures suggest that the trend in Finland, Germany and Italy is for workers to retire earlier and is something that will need to be addressed if employers are able to maintain the skills they need into the future. The opposite is the case for Austria, Belgium, Spain, the Netherlands, the UK and Sweden, where the average age of a worker retiring in 2002 was over 63 years. It does seem that a number of national governments are beginning to appreciate the need for workers voluntarily delaying retirement as one solution to prevent further difficulties beyond 2020 as the average retirement age across the EU15 increased in this period to 60.5 years.

Table 4: Average exit age from the labour force

	2001			2002			Change 2002–2001		
	Men	Wom	Total	Men	Wom	Total	Men	Wom	Total
Austria	59.2	59.9	58.5	59.3	59.4	59.3	0.2	-0.5	0.8
Belgium	56.8	57.8	55.9	58.5	58.6	58.4	1.7	0.8	2.5
Finland	61.4	61.5	61.3	60.5	60.6	60.4	-0.9	-0.9	-0.9
Germany	60.6	60.9	60.4	60.7	61.1	60.3	0.0	0.2	-0.1
Greece	59.4	61.2	57.7	-	-	-	-	-	-
Spain	60.4	60.7	60.2	61.5	61.5	61.5	1.1	0.8	1.3
France	58.1	58.2	58.0	58.8	58.9	58.7	0.7	0.7	0.7
Italy	59.8	59.9	59.8	59.9	60.2	59.7	0.1	0.3	-0.1
Netherlands	60.9	61.1	60.8	62.2	62.9	61.6	1.3	1.8	0.8
Sweden	61.7	61.9	61.6	63.2	63.4	63.1	1.5	1.5	1.5
UK	62.0	63.0	61.0	62.3	62.7	61.9	0.3	0.3	0.9
EU15	60.4	60.8	60.0	60.8	61.0	60.5	0.4	0.2	0.5

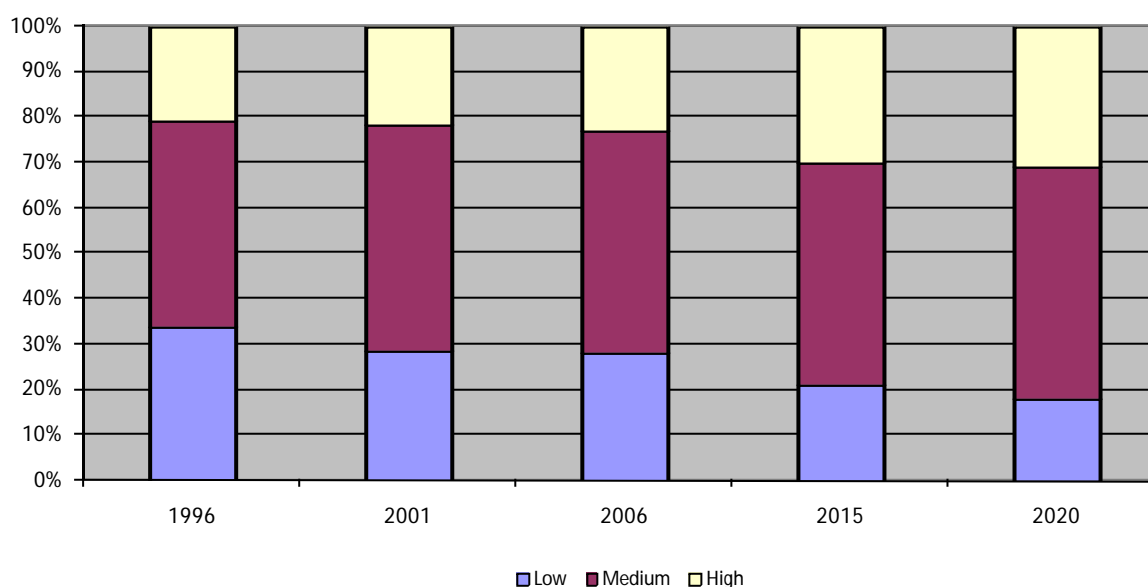
Notes: ‘ - ’ means figures unavailable.

Source: Eurostat, Labour Force Survey, annual averages

Training, lifelong learning and demographics

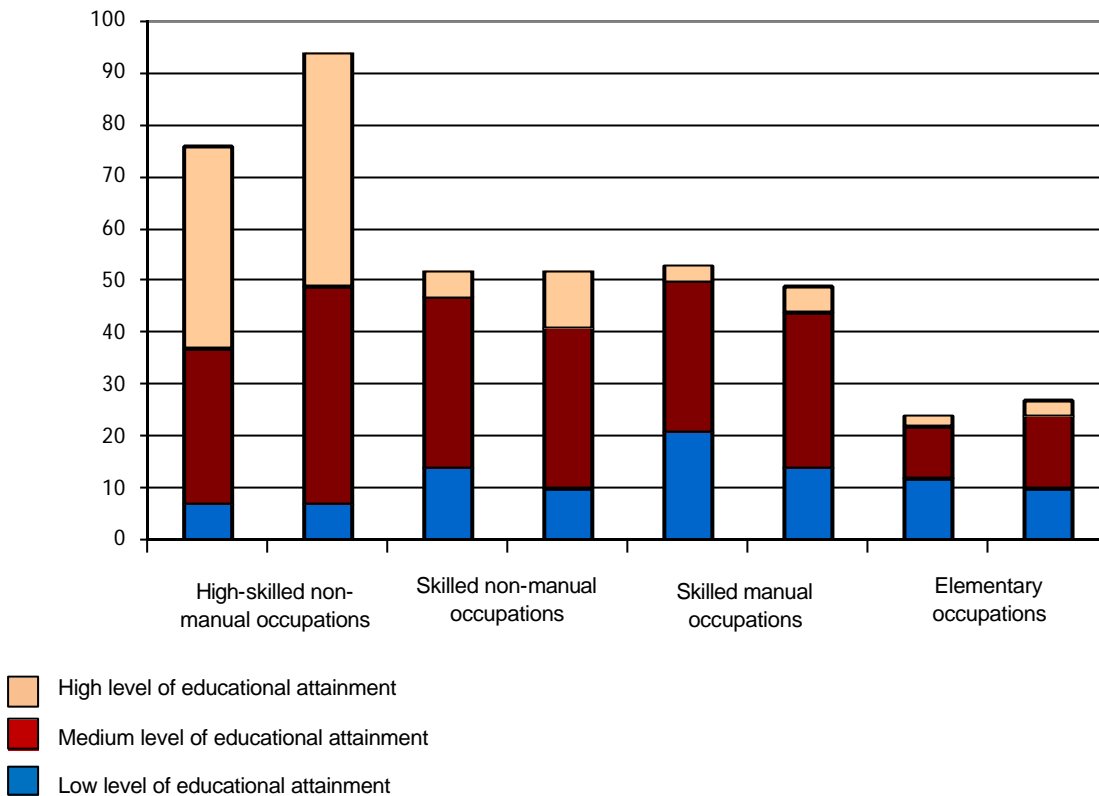
Training and education are recognised as key issues by the European Commission to improve participation in the labour market and all European member states are in the process of taking steps to develop or improve their lifelong learning strategies, under the European Employment Strategy. Education levels across Europe generally are expected to increase over the next decade as a result of the greater use of technology, newer forms of work organisation and the impact of globalisation. Projections by Cedefop (2008) suggest a decline in the number of jobs with lower qualifications, offset by an increase in both jobs requiring medium and high levels of skills. The graph below from the European Commission illustrates these predicted changes.

Graph 5: Past and anticipated employment shares by education attainment level



As technology changes and companies adapt their business strategies for new and changing markets, the skill profiles of occupations change. Across Europe generally, and a broad section of occupations, it is possible to forecast the skill level requirements for the coming years as the graph below from the European Commission illustrates.

Graph 6: The changing skill requirements across occupational groups for EU27



As the graph shows, across the EU27, all occupation categories will require a greater amount of high and medium level skills and while this is especially so for skilled jobs, it is also true for the so-called elementary occupations. As many of these workers are already in the labour market this presents employers with the challenge of offering their workers more training opportunities, especially to those currently employed within elementary occupations. However the greatest challenge will be how employers create interest and demand for training from their workforces. Table 5 below illustrates that workers who possess a high level of skills are more likely to be offered training and these workers are naturally better able to see the benefits of training and to make the link between skills and training and their pay, job satisfaction, security and future prospects.

Table 5: Participation Rate in training for workers with high and low skills (Eurostat)

Skill levels	PR in firms with training %	Training generally %
High	68	40
Low	34	17

Figures above have already demonstrated that those with fewer skills get less training opportunities, yet these workers will require up-skilling and hence more support from their employer over the coming years.

Within companies that offer training, the participation rate in training programmes for those with higher skill levels is twice as high as it is for those with low skill levels. This could be for a variety of reasons – employers favouring higher skilled workers, lower skilled workers not being interested in training, or because the nature of occupations comprising higher skills requires more training to maintain those skills. Whatever the reasons, the social partners ought to give consideration to this factor and build a training strategy that offers all employees opportunities for development, notwithstanding that certain sections of the workforce may require more training than others. Older workers generally are less likely to receive training, or want to participate in training, yet it is these workers whose participation is sought, and will be more so in the future, as the need to retain older workers due to the change in demographics becomes more acute. Another major problem is that training at work also declines with age. Even when older workers are employed in firms that invest in training, these older workers themselves are less likely to participate in this training. This is particularly true for lower skilled workers²². The issue of access to training is key, given one of the European Commission’s objectives of increasing working life beyond the traditional retirement age. However, since the overall trend is that those with higher skills are the ones that tend to receive more training, it is also crucial to focus on improving training for manual and lower-skilled white collar workers.

The European workforce is becoming better qualified and this is due to the increased number of adults completing secondary education, as the table below shows. In all three categories there has been an increase in the number of people undertaking education or lifelong learning, which demonstrates that national governments see education and re-skilling as important aspects of life. It is also encouraging to see the number of those people aged 15-64 that are undertaking lifelong learning, which suggests more and more people of working age are furthering their knowledge or skills throughout their working lives.

²² “Increasing labour force participation and promoting active ageing” European Commission (2002)

Table 6: The percentage of people achieving at least an Upper Secondary (U/S) education and those people participating in lifelong learning by age.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
20-24 at least U/S education	76.6	76.6	76.7	76.9	77.1	77.5	77.9	78.1	78.5
15-64 at least U/S education	64.4	64.9	65.8	67.2	68.4	69.4	70.0	70.8	71.5
15-64 participation lifelong learning	7.1	7.1	7.2	8.5	9.3	9.8	9.7	9.5	9.6

But employees not only participate in formal, on the job, training. Lifelong learning as a vehicle for improving the skills of workers is a key concept to consider and is broader than simply training for an individual's advancement at work. The European Commission defines lifelong learning as:

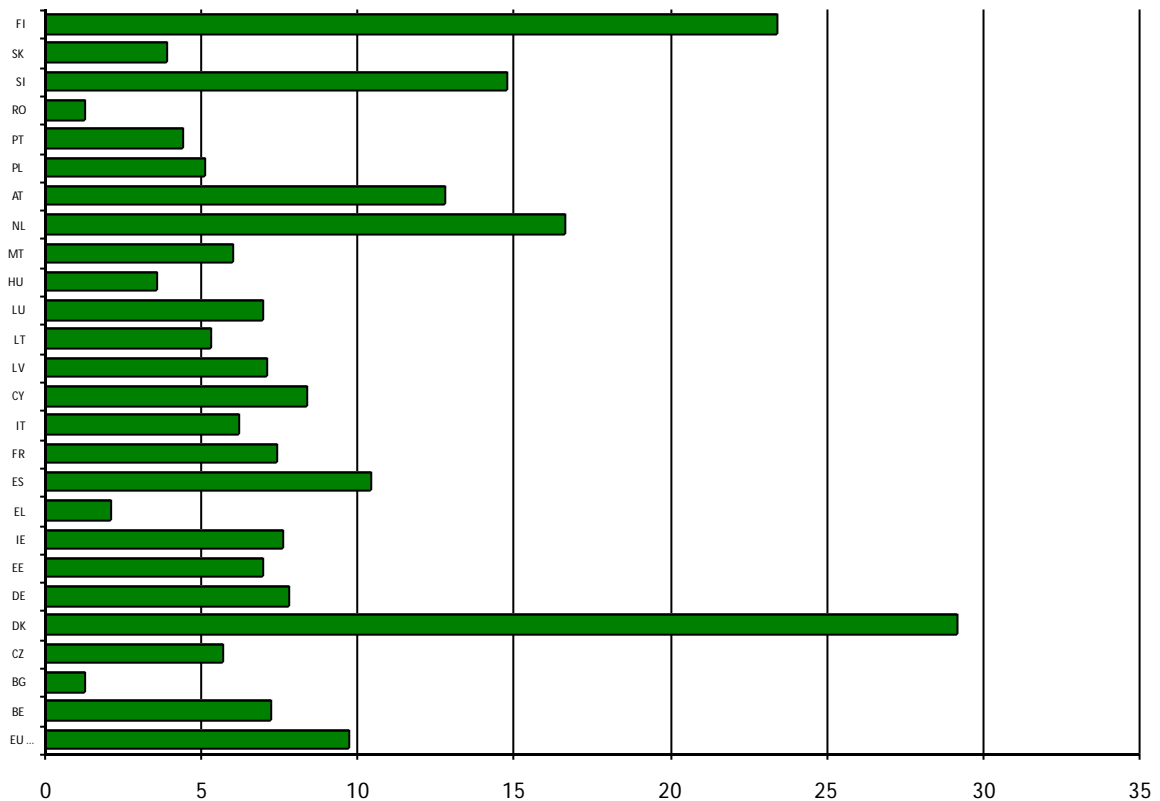
“all learning activity undertaken throughout life with the aim of improving knowledge, skills and competences within a personal civic, social and / or employment related perspective.”²³

The Lisbon Strategy is a major European initiative whose main objectives are to increase the overall employment rate within the EU27, ensuring that the European Union becomes "the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010". The Strategy is the policy vehicle upon which the European Union's targets for lifelong learning and hence worker adaptability and transferability rest. While a number of governments have made progress on improving the opportunities for adults to undertake learning whether at work, or outside of work, the EU27 average is low. Less than 10 per cent of adults across the EU27 have undertaken some form of lifelong learning, more than a third less than some of the EU states individually. The table below, from Eurostat, highlights the countries which have still to improve access to lifelong learning for their adult population.

²³ "Making a European Area of Lifelong Learning a Reality", European Commission (2001)

Graph 7: Lifelong learning excluding self learning activities

(% of population aged 25-64 participating in education and training) across EU (Eurostat).



The European Commission, as do many EU governments, sees lifelong learning as a vital component in the drive to improve working life and the overall competitiveness of European member states. Without offering employees the opportunities to further develop their skills throughout their working lives, or the chance to improve their knowledge independent of work, working adults will be less able to adapt to change, up-skill when they are required to do so and generally less able to move successfully from job to job throughout their working lives.

Access to training does not just improve job satisfaction and competitiveness, it also improves employability and reduces the likelihood of unemployment as table 6, below, illustrates.

These figures, from Eurostat, clearly demonstrate the relationship between skills and employment, and the link between higher education and higher levels of employment.

Table 7: Trends in employment rates among those aged 15-64 according to highest qualification in EU27

	0-2	3-4	5-6
2005	46.7	67.8	82.7
2006	47.0	68.4	83.1
2007	47.6	69.5	83.6
2008	47.6	70.2	84.1

Key:
 0-2 Pre-primary, primary and lower secondary education (ISCED 1997)
 3-4 Upper secondary and post-secondary non-tertiary education (ISCED 1997)
 5-6 Tertiary education (ISCED 1997)

Evidence below from Eurostat suggests that the possession of skills are positively linked to employability so if workers are to operate within a changing working environment, and one within which they are expected to adapt and adjust to new business opportunities, then it is clearly in the interests of both employees and their employers that they are supported through training and lifelong learning.

Table 8: Employment, unemployment and activity rates by educational level in the EU in 2000

	High Skilled			Medium Skilled			Low Skilled		
	ER	UP	AR	ER	UR	AR	ER	UR	AR
Total	82.4	4.9	86.6	69.8	7.9	75.9	50.1	12.1	57.0
Men	86.3	3.9	89.9	76.8	6.8	82.4	63.4	10.4	70.7
Women	77.9	6.0	82.9	62.6	9.4	69.1	37.9	14.6	44.4

Key: ER = Employment Rate UR = Unemployment Rate AR = Activity Rate

NB: The Activity Rate is the percentage of the population, employed and unemployed, which constitute the labour market. For example, 86.8 per cent of high skilled men are either employed or unemployed.

The Activity Rate for women is almost as high as for men in the High Skilled occupations and this has implications for addressing the under-representation of female workers with the

European gas sector. Employers can improve the participation of women by ensuring they have access to good training as well as career progression.

The role of the social partners

Although the employment participation rate of older workers has in fact increased slightly in recent years, this increase is inadequate to solve the problems associated with Europe's ageing population²⁴. In response to these fundamental issues both employers and employees must rethink their approaches to working life so that they can begin to reshape and redesign the process from leaving full-time education to retirement. The changes required are fundamental and include actual behaviour as well as attitudes. According to a report for the European Commission, "new patterns of working time are considered crucial since the innovative capacity of the economy will be sustained essentially by an ageing workforce"²⁵.

A report by Eurofound for the European Commission²⁶ found that overall there was little evidence of collective bargaining over age management policies and that they tended to be driven by HR departments. However the report did suggest that trade unions "could be crucial in securing or undermining the commitment of staff [and] clearly the success of measures depended to a great extent on the lead by trade unions, with good co-operative relations with management convincing the workforce that participation was worthwhile". At the end of the day the social partners must work jointly to convince workers that changes are necessary and this is more achievable if the workforce and their representatives are involved in the decision making and implementation processes.

Age management

The shape and makeup of a workforce must be examined if gas companies are to remain competitive and productive. All parts of the business should be reviewed and some radical, if contentious, changes will need to be made. For example, the traditional trend, in times of restructuring, of early retirement as a solution ought to be reconsidered as well as the problems posed by fewer younger adults entering the labour market and the differences in

²⁴ "Employment in Europe 2004: Recent trends and prospects", European Commission (2004)

²⁵ "Reforms in an ageing society", OECD (2000)

²⁶ "Employment initiatives for an ageing workforce in the EU15", European foundation for the improvement of living and working conditions (2006)

employment participation rates between men and women - proposals for the latter have been adopted by the European Commission in its Lisbon Strategy.

Age management defines the procedures and mechanisms through which employers can tackle demographic change in the workplace and the various, separate yet inter-connected, strategies available to employers can be categorised as follows²⁷:

- *Individual* - These strategies are focussed on the individual employee and relate to their health and well-being, their social relationships and the contribution older employees make to their company.
- *Collective* - These strategies, usually developed between the social partners, are aimed at groups of workers or the entire workforce.
- *Organisational* - These types of strategies are drawn up at the organisational level and are about the retention of skills and competencies, knowledge transfer, human resource practices and changes to the organisation of work and of working time.
- *Societal* - These strategies are implemented by national governments which relate to active ageing, health and well-being, pensions and health and welfare infrastructures.

Due to the problems associated with an ageing workforce the benefits of age management are multiple and include maintaining a competitive edge, the resulting opportunities for strategic and long term business planning, reduced costs through lower staff turnover, and better overall employee satisfaction. There are a number of mechanisms through which gas sector employers can actively manage their ageing workforce such as introducing policies aimed at recruiting and retaining both older and younger workers, promoting good health and well-being, flexible working time, rethinking their retirement and exit policies and engaging in social dialogue²⁸.

Benefits for employers

Given these challenges and the scale of their potential negative impact, the benefits of age management for employers might be considered to be obvious, but they are nevertheless

²⁷ “Demographic Change in the Electricity Industry in Europe”, Pillinger J (2008)

²⁸ “Demographic Change in the Electricity Industry in Europe”, Pillinger J (2008)

worth recalling here. The main benefits for employers of introducing initiatives to deal with the issues raised by demographic change , as set out by Eurofound²⁹, are:

A The benefits of securing labour supply

- Greater staff commitment
- Less stress and exhaustion among staff
- Reduced rates of staff turnover
- Decreased rates of sickness absence
- Reduction in early retirement leading to reduced pension costs

B Benefits of maximising workforce utility

- Increased participation in learning and training
- Enhanced innovative capacity
- Increase in management and supervisory competence
- Better knowledge sharing
- Reduced conflict and better team working

C Wider benefits

- Better co-operation between management and trade union/ works council
- Development of HR functions
- Better image among customers
- Perception of the company as being employer of choice

Benefits for workers

Although Eurofound classified the following aspects of age management as benefits specifically for older workers, they are included in this section as general benefits for all workers. If employers introduce age management practices, all employees will benefit providing they remain with their employer. If all gas sector employers introduced age management policies, every worker would benefit regardless if they move employers.

A Employment Opportunities

²⁹ “Employment initiatives for an ageing workforce in the EU15”, European foundation for the improvement of living and working conditions (2006)

- Job offers
- Career advancement
- Role enhancement
- Job security

B Maintenance or enhancement of health and well-being

- Improved health and well-being
- Better work–life balance
- Increased motivation
- Increased job satisfaction

C Learning opportunities and skills utilisation

- Skills development
- Adapting to different methods
- Competence utilisation

D Relations with co-workers and managers

- Feelings of appreciation and belonging
- Greater trust in management
- Better intergenerational relations

E Retirement prospects

- Better preparedness for retirement

Conclusions

Demographic change presents the European Union with enormous challenges over the next 50 years and beyond and is something that will be harder to tackle the longer there is inaction. However a positive development, for the European gas sector, is the social partners' commitment to support this study and the subsequent toolkit to, in turn, support their development of strategies and solutions for this area. The European Commission has also invested time and energy into raising the issue and to introducing policy documents and regulations, such as anti age-discrimination legislation, to ensure the political landscape supports employers' and trade union's efforts to prevent industries such as the gas sector

becoming uncompetitive and unattractive to new entrants, which ultimately threaten its very existence.

The so-called ‘baby boomers’ are not far away from retirement and this demographic shift, combined with lower fertility rates and higher life expectancy, has produced a situation across many European member states where the average age of workers is increasing year on year. If left unchecked this phenomenon will result in a scenario where fewer workers are supporting more retirees, placing at risk welfare systems and pension provisions, not to mention the strains upon economic growth and the stagnation of employment and GDP that less numbers of economically active adults will produce. In the recent past companies and trade unions tended to support employment practices that permitted the early retirement of workers in their fifties while companies underwent restructuring. However this practice sometimes meant that older workers retired without adequate succession planning, meaning that their skills and experience were not passed on to the younger generation.

All of this paints a bleak picture of Europe in the future, for employers and their workforces. Fortunately however the problem is not insurmountable and if employers and trade unions take note of the issues, the solutions are not beyond their powers. The next chapter will describe the European gas sector and highlight trends in its changing composition and expected future projections.

Chapter 3

The European Gas Sector

This sector has undergone a number of changes in the past few years which have taken place as a direct consequence of the EU liberalisation of utilities since the second half of the 1990s. The sector remains in a transition phase in many European countries, where liberalisation, restructuring and privatisation are still underway. This process has had a profound impact on employment and statistics from the European Commission show a decline of around 13 per cent of jobs in the sector between 2001 and 2005. The main influences within the sector over recent years have been the liberalisation of gas markets across Europe, climate change, increasing energy demand and restructuring aimed at improving competitiveness and productivity.

Within the EU27 the majority of gas is used for heating and generating electricity and the number of people employed within the EU27 gas industry is 246,716³⁰, across 1,300 companies³¹, ranging from just over 100 employees in Ireland to over 51,000 in the United Kingdom. Those countries with the largest share of employees within the industry are Germany, France, Italy, Poland, Romania and the United Kingdom, which together account for 81 per cent of the total workforce employed in the EU27 gas industry. The table below illustrates the composition of the European gas sector in terms of employee and customer numbers³²

Table 9: The numbers of customers and employees across the EU25

Country	Customers	Employees	Country	Customers	Employees
Austria	1,348,399	2,700	Latvia	440,800	1,340
Belgium	2,809,788	3,800	Lithuania	542,300	1,810
Bulgaria	31,000	2,900	Luxembourg	84,000	210
Czech Republic	2,845,439	4,955	Netherlands	6,600,000	8,950
Denmark	370,000	1,400	Poland	6,487,605	30,325
Estonia	55,500	315	Portugal	855,000	766
Finland	35,910	350	Romania	2,589,308	26,869
France	11,519,000	26,000	Slovakia	1,466,484	4,583
Germany	19,100,000	35,000	Slovenia	143,200	445
Greece	146,348	996	Sweden	6,782,579	6,127
Hungary	3,477,000	4,966	Spain	47,000	200
Ireland	601,741	109	UK	22,219,000	51,600
Italy	20,699,000	30,000	Totals of EU27	111,328,002	246,716

Natural gas is the second largest source of energy in the EU27 after oil¹ and EU27 members rely on natural gas to various degrees, ranging from 43 per cent of total energy consumption in the Netherlands to roughly 10 per cent in Finland. However it is predicted that growth in the sector will increase due to the demand for cleaner energy sources¹. The energy sector, of which gas plays an important role, has higher than average productivity (2.5 times the European industrial average).

Gas Supply Chain

Wholesale Market

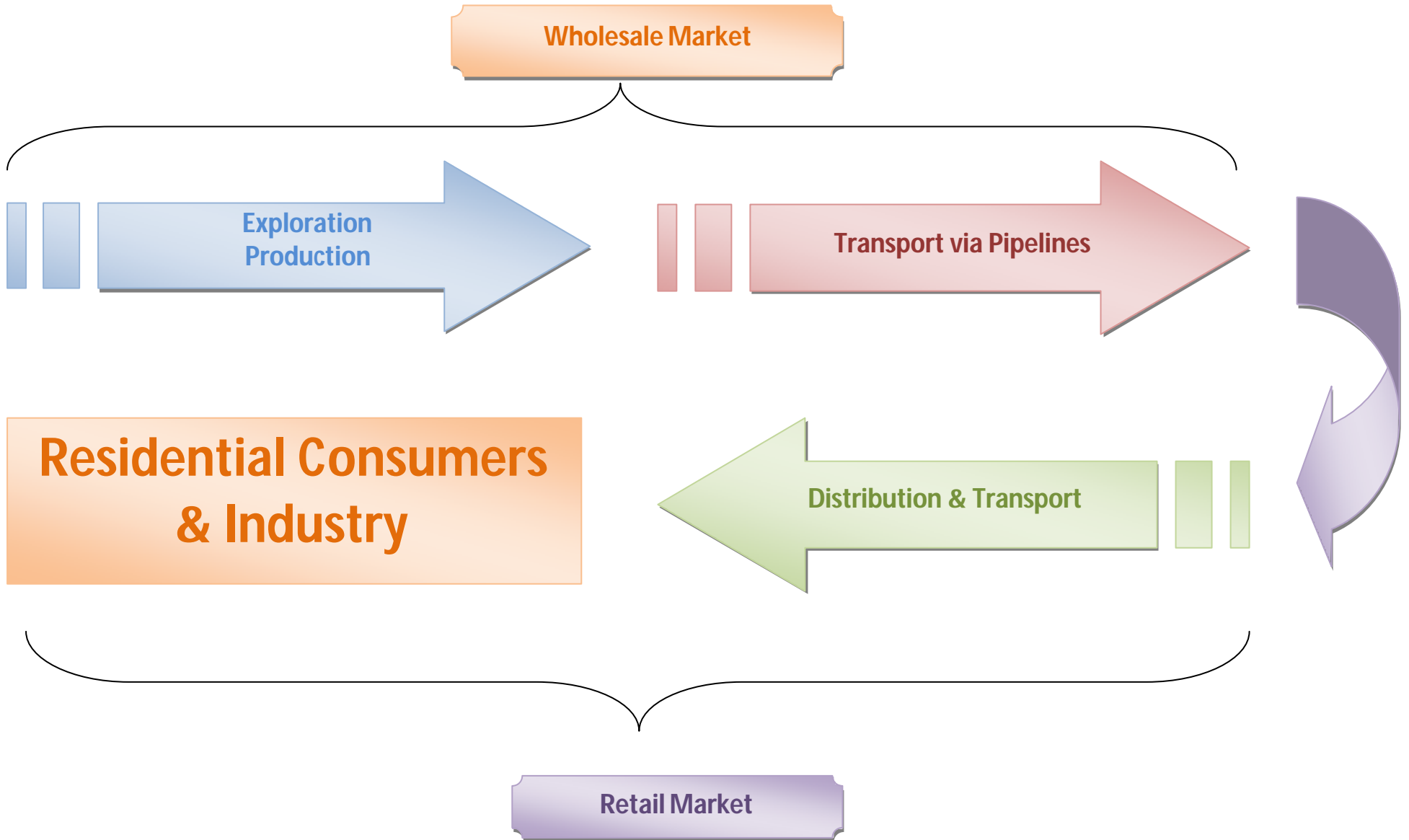
Exploration
Production

Transport via Pipelines

Residential Consumers
& Industry

Distribution & Transport

Retail Market



Gas is an important source of energy for the EU, and projections show that it will “satisfy the bulk of incremental EU energy demand³³” and its share of Europe’s energy mix is set to grow to 32 per cent by 2030. The European Commission has committed to the liberalisation of Europe’s gas markets which altered the structure of the sector, dramatically in some cases, over the last decade. By 2005 at least 86 per cent of all gas consumed in Europe was supplied to users who were free to choose their suppliers³⁴, although this figure conceals the fact that the gas markets in many EU member states are not fully opened to competition (see table 11 on page 20). Europe accounts for 19 per cent of the world’s gas consumption, with five countries consuming two thirds of Europe’s gas – the UK, Germany, Italy, France and the Netherlands. The largest European producers of gas are the UK, Norway and the Netherlands, which together account for 78 per cent of European gas³⁵. One of the key issues relating to gas as a future energy provider is its sustainability or its finiteness with the natural gas reserves in two out of the three main European gas producing states being depleted by 2030, as the table below shows.

Table 10: Reserves and reserve-to-production ratios for selected countries¹

Country	Reserves in bcm	Remaining resources	Reserve-to-production ratio (years)
Norway and Denmark	2467	5319	38
United Kingdom	905	1550	8
Netherlands	1449	1815	20
Algeria	4500	5636	53
Russia	32960	77696	46
Iran	26000		>100
Qatar	14400		>100

Russia is now Europe’s leading supplier of natural gas, accounting for 25 per cent of the market, with the UK second. In total 75 per cent of European gas demand is met by imports, with Europe relying heavily on Russia for over 60 per cent of its gas imports which throws up issues of security of supply (as the recent dispute between the Ukraine and Russia illustrates). Due to the decline of Europe’s gas reserves, and small new discoveries, this trend looks set to continue with Russia continuing to play a major role as a supplier of European gas with

³³ European Commission, “European energy and transport trends to 2030”, (2003)

³⁴ Harris, N and Jackson, M, “A picture of the European gas trading market in 2005”

³⁵ Harris, N and Jackson, M, “A picture of the European gas trading market in 2005”

Norway and Algeria playing an important role in the coming decades³⁶. Liquefied Natural Gas (LNG) is set to play a larger role in the consumption habits of all European countries in the coming decades.

The European gas sector can be categorised into three main markets – production, distribution and retail. Production can take place both on- and off-shore and is generally undertaken by international companies and the gas is then collected and distributed via a pipeline infrastructure for sale on the wholesale market. Prior to the liberalisation measures undertaken by the European Member states (see Appendix A), with the exception of exploration and production, the organisations within this sector were nationalised, state-owned monopolies³⁷. However, following these measures over the last decade the transportation, distribution and retail of European gas is now to a larger extent undertaken by private companies. Despite the measures taken by the European Commission to fully liberalise the European gas market, the degree to which each member state’s gas market is open to competition varies enormously – with 100 per cent open markets within the UK, to 47 per cent in Sweden – see table below.

Table 11: Percentage of gas market opened to competition by country³⁸

Country	Amount opened (%)
United Kingdom	100
Germany	100
Italy	100
France	37
Netherlands	65
Spain	100
Belgium	83
Austria	100
Denmark	35
Ireland	85
Finland	n/a
Portugal	n/a
Greece	n/a
Luxembourg	72
Sweden	47

³⁶ Ibid

³⁷ CPB, “Market Failures and government policies in gas markets” (2006)

³⁸ Data unavailable for New member States

European regulation

Over the last decade the European Commission has produced a number of key policy documents and regulations and these are set out in Appendix A. Jointly they have fundamentally altered the structure and composition of the European energy sector, producing greater competition, albeit inconsistently across EU member states.

The liberalisation of the sector began with the European Union's first piece of legislation in 1998 which sought to unbundle the transmission, production and trading entities of the previously state owned monopolies. Within Europe, the UK was one of the first to fully open its markets to competition, and other EU member states have followed suit. However the marketisation of the European gas sector is still immature and will not be fully open across all member states for some time to come. As the market share of many of the previously monopolistic state owned companies has fallen, they have looked to other countries' markets for growth and have achieved this by acquisitions, and diversifying into other markets such as selling electricity and other utility products.

European gas usage

Although Europe has only 4 per cent of the world's share of gas reserves, it accounted for over 12 per cent of global production, due to the heavy demand for gas within the EU³⁹. The demand for gas fluctuates enormously depending, for example in relation to residential users, on the season or the time of day – the winter and summer ratio is 65:35⁴⁰. According to the European Commission, the “increase in primary energy⁴¹ between 2005 and 2030 will be overwhelmingly met by renewables and natural gas, which are the only energy sources that will increase their market shares⁴².” This same report also states that production of natural gas is expected to grow by 64 per cent by 2030, will make up 32 per cent of European total energy consumption and industrial and domestic energy consumption are also set to grow, despite shifts towards more environmentally friendly alternatives. However the use of renewable energy is set to increase but due to the expected increase in the demand for electricity, its share of energy production will fall from its current 50 per cent to 38 per cent by 2030. And by 2030 gas is the most important fuel, due to an expectant 150 per cent

³⁹ Harris, N and Jackson, M “A picture of the European gas market in 2005”

⁴⁰ Zwart, G and Mulder, M, “A model of the European natural gas market”, (2006)

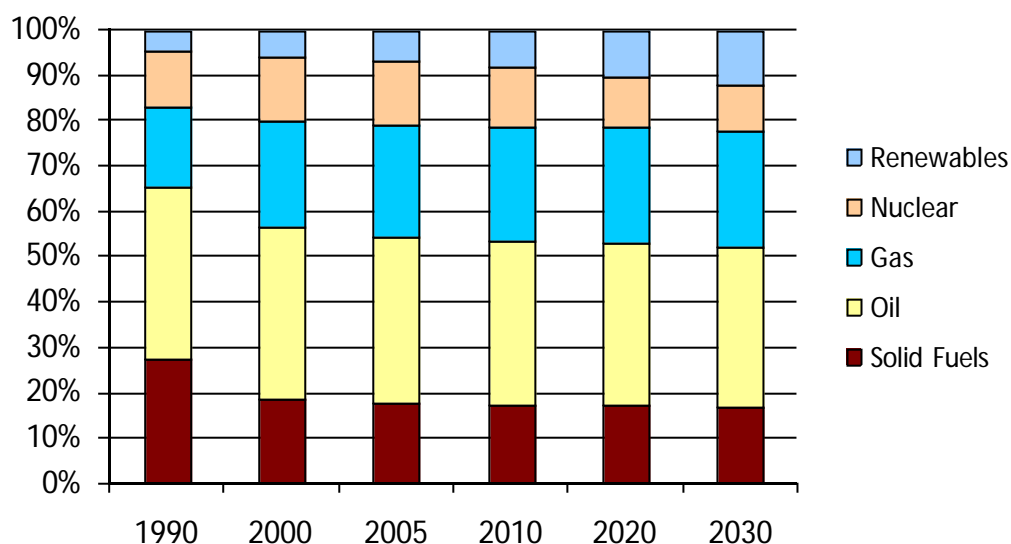
⁴¹ Primary energy consumption refers to the direct use at the source, or supply to users without transformation, of crude energy, that is, energy that has not been subjected to any conversion or transformation process.

⁴² European Commission, “European energy and transport trends to 2030”, (2007)

growth in the demand for gas-based electricity, according to the European Commission’s report.

Table 12 and Graph 8: Percentage share of energy sources in total primary energy⁴³

	1990	2000	2005	2010	2020	2030
Solid Fuels	27.3	18.8	17.7	17.2	17.4	16.7
Oil	27.9	38.0	36.7	36.4	35.7	35.3
Gas	17.9	23.0	24.6	24.9	25.7	25.7
Nuclear	12.3	14.2	14.2	13.2	11.3	10.3
Renewables	4.5	5.9	6.8	8.2	10.0	11.8



The European gas workforce

As research from ECOTEC⁴⁴ has already identified there are a number of very important trends to appreciate when examining the European energy sector:

- The industry has an ageing workforce
- Women are significantly under represented, accounting for less than 20 per cent of the workforce

⁴³ Kingston Energy Consulting, “Is the European gas market ready for 2007 ?”, (2003)

⁴⁴ “The effects of the liberalisation of the electricity and gas sectors on employment”, ECOTEC (2000)

- The skills profile of the sector is one of semi-skilled, skilled technical and middle management
- There is a traditional ‘job for life’ expectation within the sector

These characteristics have profoundly affected the sector and its workforce development, planning, retirement and operational policies. For instance, the age profile of the workforce has enabled employers, with the support from trade unions, to offer voluntary redundancies through early retirement. In addition the ECOTEC report highlighted that the majority of jobs have been lost across the semi-skilled and skilled technical areas and this has posed problems of skills transferability for those people exiting the industry.

The figures for the gas sector are not easy to isolate from the combined figures for electricity, gas and water. However, according to ECOTEC⁴⁵, it has been estimated that more than 250,000 jobs have been lost in the electricity and gas sectors in the period 1990 – 1998, with those states embracing liberalisation to the greatest extent showing the largest number of job losses, for example the UK and Germany. On the contrary the job losses have been experienced to a lesser degree in those countries that have adopted less liberal approaches to deregulation, for example France. The table below shows the reduction in jobs with the energy sector over 13 years.

Table 13: Employment trends by industry EU25 (000's employed) (Cedefop)

	1996	2006	2015	1996-2006	2006-2015
Gas, electricity and water	1 817	1 514	1 364	-1.8	-1.2

According to the European Commission:

“Occupations within the sectors are dominated in the EU by engineers, office clerks and secretaries, extraction and building trades and electronic equipment mechanics. Compared with the new Member States, the EU 15 has particularly more managers, engineers, other professionals and office clerks and secretaries”⁴⁶.

⁴⁵ECOTEC, “The Effects of the Liberalisation of the Electricity and Gas Sectors on Employment”, (2001)

⁴⁶ “Sector Report for the Gas, Electricity and Water Sector”, TNO et al (2009)

The table below highlights those sectors which feature prominently within the European gas sector.

Table 14: The main occupational groupings within the European gas sector

Occupation Group	Description
Managers	Top management; entrepreneurs; different management occupations, (HRM, Finance and Production management)
Business and finance professionals	Accountants, financial controllers and finance professionals and sales professionals.
Engineers	Electrical and mechanical engineers and engineering technicians.
ICT Professionals	Computer operators, system designers, equipment operators, programmers and industrial robot controllers
Administration and customer service	Administrative functions, including order administration, order preparations and customer service.
Construction workers	Pipe fitters, electricians, welders and electrical mechanics fitters.
Plant operators	Responsible for the working of the plants and infrastructure
Labourers	Responsible for the basic workload, for example lorry drivers

While the table below confirms the gas sector's ageing workforce, it does however allow us to isolate a number of occupations and to inform decision makers about the demand for particular occupations to be given special attention. For instance, Engineers are to be found in each age range, but they are more numerous in the younger age range. So if the trends from 2000 to 2006 are projected forward (the reduction in engineers for younger workers, while an increase in engineers at the older age range), at some point during the next decade, more engineers will be in their fifties than in any other age range. This has implications for the recruitment and retention strategies of employers.

There is now also fewer numbers of service workers, extraction workers, and machinery workers in the lower age range. If the sector needs to maintain the same number of workers in these occupations in the future, then particular attention will need to be given to how employers achieve this. However due to the movement in new technology it is envisaged that the lower number of machinery workers over the coming decade will not adversely affect the industry as these workers will be required less in the EU15 where technological developments and introductions are at their quickest, resulting in a lower reliance on these types of occupations to maintain competitiveness.

Table 15: The share and the changing share in age composition of EGW sector occupations (2000 -2006)¹

Occupational Group	15-39		40-49		50 +	
	%*	% Change	%	% Change	%	% Change
Managers	29	5	34	-7	37	2
Computing Professionals	49	-2	34	-5	16	7
Engineers	36	-2	32	-1	31	3
Business and Finance Professionals	47	-2	30	2	24	0
Other Professionals	38	3	34	1	28	-4
Office Clerks and Secretaries	47	0	27	-4	25	4
Service Workers	42	-10	28	0	31	10
Extraction and building trades	39	-7	33	2	28	5
Metal blacksmiths, machinery workers	35	-11	31	0	34	11
Electronic and electrical equipment mechanics	39	-4	33	-2	28	7
Other craft and trades workers	49	1	10	-7	24	6
Chem, Proc, Powerplant, robot operators	29	-11	39	4	32	8
Other plant and machine operators	33	-6	37	3	29	3
Labourers	35	-5	34	3	31	2
Total	38	-3	33	-1	29	4

Naturally, the number of people employed in specific occupations within gas industry has changed as the demand for their particular skills has increased or decreased. The following table gives this information per occupation group.

According to Eurostat, the average annual wages for workers employed in the electricity, gas and water sectors across the EU25 is €26,715.66, the highest paid workers in Luxembourg (€49,308.86) and the lowest paid in Bulgaria (€2,666.17). This figure rises if we examine male only earnings - €3,144.75. These figures tally with the hourly paid figures – the highest is in Luxembourg (€20.81) and the lowest being in Bulgaria (€1.15). On average workers within the electricity, gas and water sectors receive better pay than the average across the EU25 for all occupations.

Training, Education and Lifelong Learning

Table 16: Showing the percentage of those within typical gas and electricity sector occupations with either low, medium or higher skills sets.

Occupations	% Low	% Mid	% High
Managers	3	28	70
Computing professionals	5	38	56
Engineers	4	47	49
Business professionals	8	47	46
Other professionals	5	55	40
Office clerks and secretaries	13	70	17
Service workers	15	79	6
Extraction and building trades	16	78	6
Blacksmiths and machine operators	11	86	4
Electronic equipment mechanics	11	79	9
Other craft and trades workers	11	78	2
Chemical process plant operators	17	75	8
Other plant and machine operators	20	75	5
Labourers	30	67	4

The above table sets out the skills profiles of the various occupations within the gas sector and confirms the general perception of high skilled workers and their occupations within the sector. However if we examine the movement across the period 2000 – 2006, it becomes clear that a number of occupations have experienced a growth in the proportion of high and medium level skills, illustrating the notion that more skills are requiring higher skilled workers and this has implications for national education and company training programmes.

Table 16: The change in share of high and medium educated employees by occupational grouping within the EGW sector for the period 2000 – 2006 (Sector Report)

Occupational Grouping	% Medium	% High
Managers	-2	3
Computing Professionals	3	-1
Engineers	2	-1
Business Professionals	-4	10
Other Professionals	-3	2
Office Clerks and Secretaries	-2	6
Service Workers	16	-8
Extraction and building trades	10	-1
Metal blacksmiths, machinery workers	15	-4
Electronic and electrical equipment mechanics	20	-5
Other craft and trades workers	-6	1
Chem, Proc, Powerplant, robot operators	12	-4
Other plant and machine operators	6	0
Labourers	11	0
Total	5	1

The table above shows the changes in the skill makeup of each gas sector occupational group. Those in bold display the highest growth rates, while those in italics denote the biggest falls. Occupations like business professionals, managers and office clerks and secretaries have seen big rises in the number of post holders with higher level qualifications while six occupations have seen large rises in the number of post holders with medium qualifications. This could be as a result of the higher expectations of employers for these occupations, or simply a result of a greater educated workforce chasing jobs that were previously done by less educated employees. Although precise competencies currently required for those working within the European Gas sector will vary from employer to employer and country to country, it is possible to outline the general trends across Europe and to calculate from these the likely trends for the future. Perhaps, unsurprisingly, those occupations generally associated with high level skills are more likely to be populated with individuals with greater educational attainment, and the converse is true of those occupations generally associated with requiring lower skills to perform.

Across the EU27 33 per cent of all employees participate in Continuing Vocational Training (CVT). However this figure increases dramatically to 57 per cent for those employed within electricity, gas and water (EGW). The table below shows the percentage of workers within EGW who are participating in CVT at work. The figures suggest that although those within EGW occupations generally undertake more training than do those workers on average in other sectors, the percentage of those workers within EGW that are over 55 is far lower than those aged between 25 and 54 years of age, throwing up issues of continuing professional development towards the traditional retirement age.

The majority of the workforce within the European energy sector is made up of workers with medium educational attainment, especially within the newer member states. However the share of highly educated workers is 4 per cent higher within this sector, across the EU15, than the average⁴⁷.

As the table shows, more workers undertake training within the European energy sector than the average for EU 27 countries, which in itself suggests that either energy employers already take seriously the need for training up-skilling, or that, on average, the roles within the energy

⁴⁷ “Investing in the future of jobs and skills” TNO (2009)

sector require more training when compared others sectors. Either way the sector has firm foundations and a commitment to training on which to build in order to remain competitive. However unless the training opportunities are distributed across the occupation spectrum within the sector some groups of workers, especially the lower skilled, will be left behind. Employers must ensure that they utilise their entire workforce give the demographic changes previously explained.

Table 17: The percentage of workers undertaking continuing vocational training in EU27, by age and by gender in the energy sector and all sectors.

All	M (%)	F (%)	<25 (%)	25-54 (%)	>54 (%)
EGW	57	55	34	49	35
All sectors	34	31	29	33	24

As well as offering more training to its workforce, the training undertaken in the EGW sector costs more than in other sectors, as the table below shows. Presumably this is due to the specific nature of the sector and the requirement for more tailor made training programmes rather than general training.

Table 18: The cost of training as a percentage of total labour costs

Sector	Cost
EGW	2.5 %
All Sectors	1.6 %

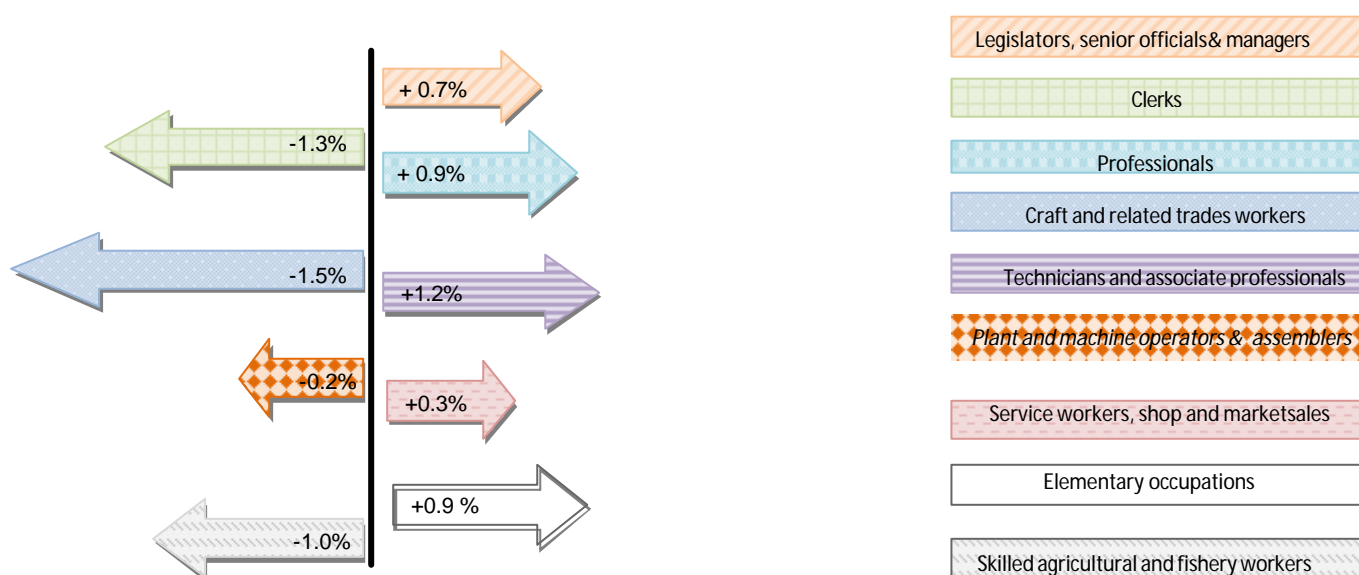
Employment in electricity, gas and water is dominated by mid educated workers. This is even higher in the new Member States, where only 4% of employment consists of low educated workers. In both new and old Member States a decrease is visible in low educated workers, while in most cases the share of mid and high educated workers increased. The share of high educated workers is even 4% higher than for the whole economy in the EU 15, but 12% lower in the new Member States.

Job Forecasting

Within the EU25 the overall effect of job destruction and creation before 2015 will be the net gain, according to Cedefop, of over 13 million new jobs⁴⁸, and 19.6 million according to the European Commission⁴⁹, and these figures include a loss of 2 million jobs in the primary sector and half a million in manufacturing. Cedefop⁵⁰ has suggests that the implications of this are a growth in demand for high and medium skilled workers and a small growth in the requirement for elementary occupations which will require no or little formal skills. The rate of change across all sectors of Europe’s economies will mean that lifelong is vital, hence the work of the European Commission and national governments to make this a reality over recent years.

Cedefop, utilising the IER estimates based on Cambridge Econometrics E3ME model, has forecast that there will be an overall expansion in demand in five of the nine occupational categories below.

Figure 2: Employment trends by broad occupations EU25, shares in %. (page 50 Cedefop)



If properly co-ordinated and regulated these changes in demand could be met by the supply of workers to the necessary skill levels. However skill shortage and skill gaps are common already, pointing to distortions in the supply/demand relationship. Therefore for the purposes of this study it will be assumed that a perfect match between these two variables

⁴⁸ “Future skill needs in Europe”, Cedefop (2008)

⁴⁹ “New Skills for New Jobs –Anticipating and matching labour market and skills needs”, EC Staff Working Document (2008)

⁵⁰ The European Centre for the Development of Vocational Training (see www.cedefop.europa.eu)

will not be achieved by the market alone and the responsibility for ensuring employers have the right workers with the right skills at the right time will fall upon the social partners and governments.

Examining the Cedefop data shows that employment across the EU25 is expected to grow by 0.7 per cent between 2006 and 2015, with the largest demand at the extremes of the skill spectrum - that is within the elementary occupations (+1.6 per cent) and technicians and associate professionals, and legislators, senior officials and managers (both at +1.5 per cent). Within the EU25 the replacement demand, or the demand for workers to replace those retiring or leaving a particular occupation, is highest for service workers and shop and market sales workers.

Gas companies do not operate in isolation and will need to compete with other sectors for workers, particularly after 2020 when the labour markets across Europe are expected to tighten and growth expected to fall. The main competitors for gas sector companies seeking to recruit adequately skilled workers will be other energy and utility companies. There will also be a shift from a mainly blue collar workforce within the new member states to a workforce mainly composed of white collar workers. This has already been witnessed in those countries in which the gas market has been liberalised. This movement towards a 'cleaner' career may mean that the gas sector becomes more appealing as a career for women and young, more scientific, labour market entrants. However the current moves towards nuclear energy by a number of governments could also mean that the gas sector will be competing with the nuclear sector for these technical and scientific workers.

As the table below shows, less people are now employed in traditional industrial occupations than ever before, as the table above demonstrates and this has implications for the gas sector. While employment generally in EU27 has continued to expand, the share of workers employed in industry has fallen annually. It could mean that those workers being made redundant as traditional industrial companies close are able to be retrained and utilised in the sector, or it could mean that there is currently a skills mismatch and if national governments are able to better match their economy's skills with available job opportunities then these 'surplus' workers will cease to exist as the younger workers, leaving school or college will be trained in so-called newer occupations and work in the service sector or 'knowledge economy'.

Table 19: Showing the percentage of people employed in industry and the rate of growth of employment, both across EU27

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
% Emp	27.3	26.9	26.5	26.1	25.6	25.4	25.2	25.1	25.1	24.8
Growth	1.0	1.5	1.0	0.4	0.4	0.7	1.0	1.6	1.8	0.9

Table (number) in the Appendix, from data provided by Cedefop, highlights the trends, both in levels and growth, across the EU25 generally over the coming years. The largest growth areas are for corporate managers, other professionals and teaching associate professionals, whereas the largest decrease is expected to be in occupations such as skilled agricultural and fishery workers and precision, handicraft, craft printing and related trades workers. From this table it is possible to extract those workers that fit within the scope of the gas sector and these are shown in the table below.

The table below gives an indication of some of the occupational trends within the European energy sectors⁵¹.

Table 20: The growth and decline in number within selected energy occupations (2008)

Occupation	Growth (%)
<i>Corporate managers</i>	2.5
<i>Physical, mathematical and engineering science professionals</i>	1.7
<i>Other professionals</i>	2.6
<i>Physical and engineering science associate professionals</i>	0.6
<i>Other associate professionals</i>	2.0
Office clerks	- 1.1
<i>Customer service clerks</i>	1.3
Extraction and building trade workers	- 0.6
Stationary plant and related workers	- 0.1
<i>Machine operators and assemblers</i>	0.2
<i>Drivers and mobile plant operators</i>	0.6
<i>Sales and services elementary occupations</i>	2.0
<i>Labourers in mining, construction, manufacturing and transport</i>	1.0

⁵¹ "Investing in the future of jobs and skills" TNO (2009)

So across the EU25 Cedefop expects there to be an increase in the number of required workers qualified to undertake work in 10 of the 13 occupation groups, required by the gas sector. Although these figures don't accurately reflect the requirements of the gas sector, they do allow the social partners to consider competition from other sectors for workers already within the sector and to devise strategies to overcome these challenges. According to the Cedefop, "in 2006 it is estimated that just under 80 million of the 210 million people employed in Europe were doing higher level jobs such as management, professional work of one kind or another or technical support of those activities. These areas are all expected to experience increase in demand over the next decade"⁵² and it is highly probable that the gas sector will require a large number of these.

Social dialogue within the European gas sector

Employees' interests within the European gas sector are represented, initially by their national trade unions, and at the European level by two European trade union federations. The European Public Services Union (EPSU) represents over 8 million employees from 200 trade unions, including those working within the public services (including utilities that have been privatised) and the European federation for workers in the Mining, Chemical and Energy sectors (EMCEF) represents 2.5 million workers in 35 countries and 128 national trade unions across Europe.

The interests of the European gas employers are represented by Eurogas which comprises 47 members from 27 countries, including 34 natural gas companies, 12 federations of natural gas companies, and one international organisation. In 1998 EPSU, EMCEF and Eurogas began the process of social dialogue through which they have discussed issues such as health and safety, vocational education and training. This process is formally recognised by the European Commission and held its first meeting in March 2007. The committee enables the social partners to have a formalised input into European Commission's policies affecting the sector, offering them the opportunity to contribute to the consultations launched by the Commission on social policy, which can lead to European agreements supporting the interests of the sector and strengthening its performance in the long term.

⁵² "Future skill needs in Europe", Cedefop (2008)

If the gas sector social partners genuinely seek to influence the age profile, skills and diversity of their workforce in the long term there is a possibility of creating the right environment, through adapting current practice, policies and attitudes in order to achieve the required change.

Table 20: Employment trends by job function: Shares (%) in 2006 and changes in shares (%) 2000-2006

Gas, Water and Electricity	Shares, 2006			Changes in Shares 2000–2006		
	EU15	NMS	EU	EU15	NMS	EU
Managers	7	5	6	1	0	0
Computing professionals	3	2	2	1	0	0
Engineers	20	16	18	3	4	4
Business professionals	5	3	4	1	1	1
Other professionals	10	7	9	1	<i>-11</i>	<i>-4</i>
Office clerks and secretaries	17	9	14	<i>-1</i>	<i>-2</i>	<i>-1</i>
Service workers	1	1	1	<i>-</i>	<i>-1</i>	0
Extraction and building trades	9	11	10	<i>-1</i>	1	0
Blacksmiths and machine operators	4	9	6	0	1	0
Electronic equipment mechanics	10	13	11	<i>-3</i>	5	0
Other craft and trades workers	0	1	0	0	0	0
Chemical process plant operators	6	11	8	<i>-1</i>	4	1
Other plant and machine operators	3	6	5	0	0	0
Labourers	4	6	5	0	<i>-2</i>	<i>-1</i>

The table above highlights the changes in the age groups undertaking work within the EGW sector occupational groupings. Those occupational groups who have declined in numbers are shown in italics. While those showing growth are shown in bold. The table clearly shows that the numbers of workers in the 50 + age range have increased in the period 2000 to 2006 at the expense of workers in the age range 15 to 39. However there has been an increase in this period in the number of managers in the 15 – 39 age range which ought to be examined further.

The majority of jobs in the gas, electricity and water sectors are in the categories of engineers, office clerks and secretaries, extraction and building services and electronic equipment mechanics. It is clear from the table above that most occupations have remained

relatively stable over the period measured, with only ‘*other professionals*’ showing a real decrease.

The SWOT analysis below, builds on the TNO⁵³ analysis for the energy sector.

Figure 3: SWOT Analysis of the European gas sector

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> - Growing demand for energy - Growing demand for ‘cleaner’ energy - New opportunities as a result of new technologies - Sound financial position - Social Partners aware of the issues and working jointly to solve 	<ul style="list-style-type: none"> - Often monopolistic behaviour - Complicated regulatory environment - Large inefficiencies - Capital intensity - Geographically fragmented market - Low attractiveness
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Stable, transparent. Predictable regulation - Large possibilities to decrease costs - De-monopolisation - Regulatory environment relating to possible creation of ‘green jobs’ - R&D - Newer forms of work organisation due to technological innovation 	<ul style="list-style-type: none"> - Lack of resources - Security of supply - Competition from ICT workers - Competition from other sectors for engineers and technicians - Loss of control due to liberalisation - Investments can take a long time to realise - Financial crisis may make it more difficult to invest - Competition from renewable - Changes to meter reading

⁵³ “Investing in the future of jobs and skills” TNO (2009)

Conclusions

The European gas sector plays a vital role, firstly, as a provider of energy which is set to increase due to its green credentials and also our reliance on gas as a source of power. Due to security issues European states will require maintaining the current level of activity, if not an increase, dedicated to gas exploration. Second the European gas sector is a major employer and constitutes an important network, which in turn feeds a supply chain on which many more companies rely. The European Commission has introduced a number of regulatory measures to ensure safety and competition and the latter has brought about the liberalisation of the gas sector in many European countries, although not all states have totally opened their markets to competition.

Evidence from this section of the report also confirms the validity of the following statement from Eurogas:

- The industry has an ageing workforce
- Women are significantly under represented, accounting for less than 20 per cent of the workforce
- The skills profile of the sector is one of semi-skilled, skilled technical and middle management
- There is a traditional ‘job for life’ expectation within the sector

It also demonstrated that fewer workers are now employed in traditional blue collar or industrial occupations than previously and that there has been a shift within the sector across occupations. In common with other sectors of European economies the gas sector is witnessing an increase in the level of educational attainment of its workforce and an increase of the skills required by employers to perform roles which were once seen as unskilled. Those employed within the higher skilled jobs have witnessed their roles requiring an even greater proportion of high skilled activity than before and this trend, although to a lesser degree, has affected medium and so called elementary roles.

According to several sources, including Cedefop, it has been shown that there will a greater demand for a number of gas sector occupations from employers across the EU, and, at the same time, a decrease in demand for others.

The next section of the study will use available data to illustrate general trends within the gas in the future and highlight key issues so that the social partners are able to produce remedies for the challenges and a work programme to exploit the opportunities.

Chapter 4

The future of the European Gas Sector

This chapter seeks to highlight the future trends in terms of education, skills, the workforce, and the size and look of the European gas sector and this will be achieved by utilising existing data and the returned surveys to construct possible scenarios. This section of the study will attempt to identify the future projected trends for these groups, their likely training requirements and of the ease or difficulty by which gas employers will be able to recruit them into, and retain them within, the sector.

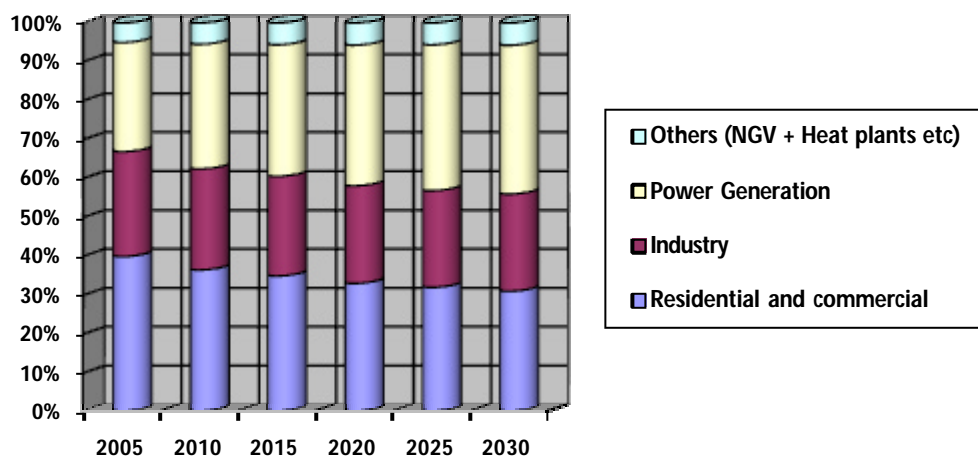
It is not surprising that the issues thrown up throughout this report will have a large impact upon the European gas sector over the coming decades. Employment levels, training, recruitment, retention and retirement will all affect the industry and will severely test its ability to remain competitive and prosper. Although there are a number of challenges posed by the multitude of expected changes over the next 20 years, due to climate change, migration and population ageing, which are beyond the control of individual companies or trade unions, or even groups of employers and unions, there is a substantial amount of work that the social partners can undertake to reduce their impact. This chapter will seek to highlight the challenges faced by the sector and demonstrate that, by working together, employers and trade unions within the European gas sector can solve the projected difficulties brought by an ageing workforce and changing skill requirements so that it is better placed to ride the storms ahead. From the returned questionnaires it is possible to draw a number of conclusions and these will also be explored with in this chapter, cross referencing this data with the published research available from sources such as Eurostat, Eurogas, EPSU, EMCEF and other reliable sources. Finally the chapter will highlight potential solutions to these challenges which will then be further development in the Toolkit.

As historic trends have already demonstrated operations within the gas sector are more likely to be undertaken by fewer people as technology offers less labour intensive methods for producing the same level, if not higher levels, of output. However developments in energy production will result in the introduction of new roles and changes to the organisation of work. The current trends for residential and commercial energy users to waste less energy will also have an impact upon the sector, as will the demographic issues already raised in this study.

We know that the European gas sector, in common with other sectors, has seen a large increase in the number of workers it requires qualified to a medium and higher level and this trend is set to continue. The European Commission and a number of national governments are already working towards greater education participation, post secondary school, and greater adult participation in higher education as well as expectations of individuals undertaking lifelong learning throughout their working lives. If we assume these policies will remain in force, we can also assume that this trend will continue.

Given the interest across European governments, and within the European Commission, of the continual improvements in energy efficiency and building insulation it is possible to predict that, despite the increase in its share of the overall total energy market (as we have already seen on page 36) – partly due to its ‘green’ credentials compared to those of coal - the gas sector will see its usage decline among its residential and commercial customers over the coming decades. This trend is confirmed by findings from Eurogas which suggest that the growth in gas usage over the coming decades is likely to come from the industry and power generation sub sectors and to a lesser extent industry (growth of 2.7 per year – Eurogas), as the graph below from Eurogas shows.

Graph 9: The projected changes in gas usage over the coming decades¹.



Occupations fundamental to the generation of power will require a greater number of workers in the coming years. There will therefore be an increase in the demand for engineers and other power plant occupations in the future. In addition (again from data provided by Eurogas), the amount of investment required by the gas sector over the coming years is €10bn and it is required in all sections of the gas supply – exploration and development, transmission systems (which include Liquefied Natural Gas infrastructure) and storage.

Eurogas also states that “there is already high market penetration in some major gas consuming countries ... over time other countries will also reach saturation in the residential market ... the low population density, settlement structures and topographical conditions in some countries set relatively narrow economic limits to greater market penetration”⁵⁴.

So the possibility of gas companies increasing their penetration rate is low in those countries where there is already a high usage of gas, and at some point in the future penetration will be limited in other countries whose gas usage is currently expanding. This will limit the growth of the sector in the future. It does mean that in those countries with lower market penetration there will be less pressure to rationalise employment in the coming years as the market expands and so too will employment.

It is perhaps worth mentioning at this point the effects of liberalisation on the energy sector workforce generally, and figures are available which demonstrate that, for specific workers, liberalisation has in the past brought bad news. Those workers more likely to be negatively affected by the liberalisation of the energy sectors tend to be older, low skilled males working in the distribution sector⁵⁵. Bearing this in mind employers ought to give consideration of the future impact of liberalisation alone on these groups of workers.

Table 21: Employment trends by job function -shares (%) 2006 & changes (%) 2000-2006⁵⁶

Gas, Water and Electricity	Shares, 2006			Changes 2000-2006		
	EU15	NMS	EU	EU15	NMS	EU
Managers	7	5	6	1	0	0
Computing professionals	3	2	2	1	0	0
Engineers	20	16	18	3	4	4
Business professionals	5	3	4	1	1	1
Other professionals	10	7	9	1	-11	-4
Office clerks and secretaries	17	9	14	-1	-2	-1
Service workers	1	1	1	-	-1	0
Extraction and building trades	9	11	10	-1	1	0
Blacksmiths and machine operators	4	9	6	0	1	0
Electronic equipment mechanics	10	13	11	-3	5	0
Other craft and trades workers	0	1	0	0	0	0
Process plant operators	6	11	8	-1	4	1
Other plant and machine operators	3	6	5	0	0	0
Labourers	4	6	5	0	-2	-1

⁵⁴ “Natural Gas Demand and Supply – long term outlook to 2030” Eurogas (2008)

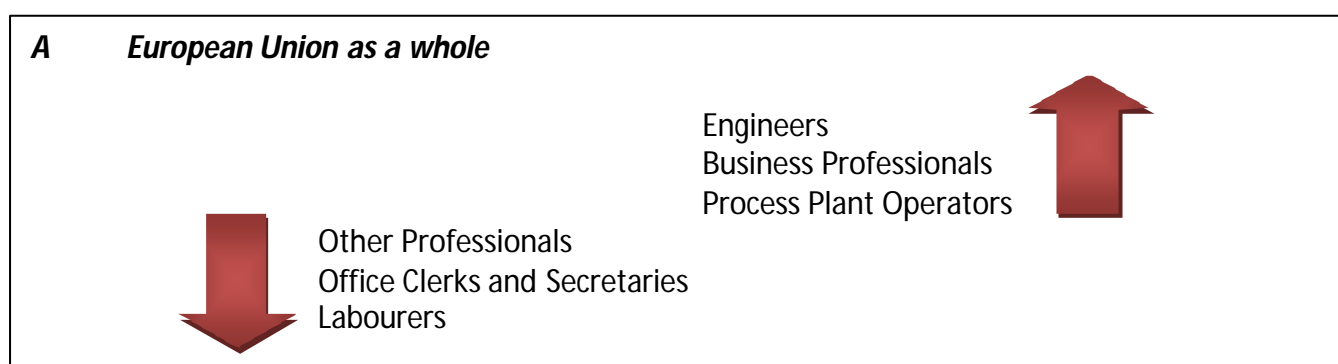
⁵⁵ “The Employment Impact of the opening of Electricity Markets” ECOTEC (2007)

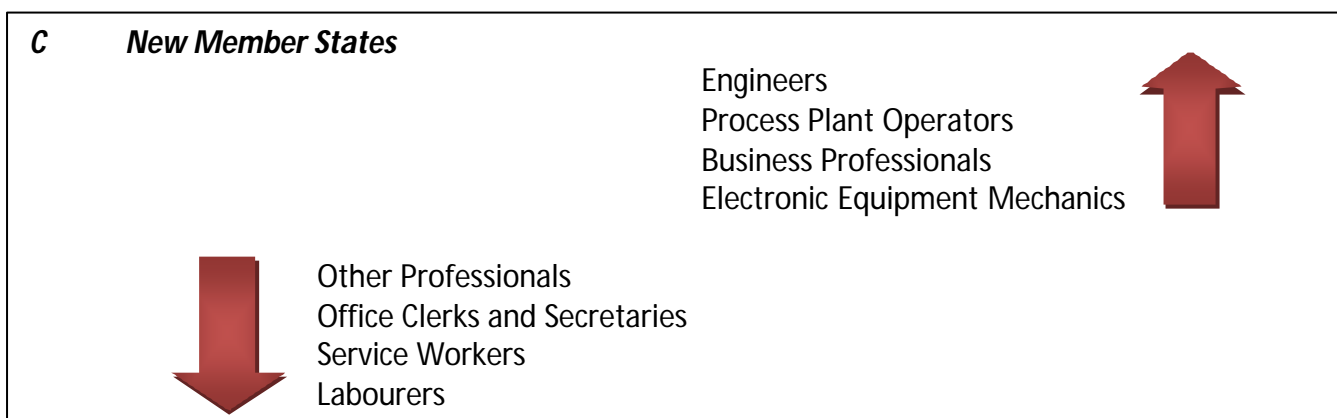
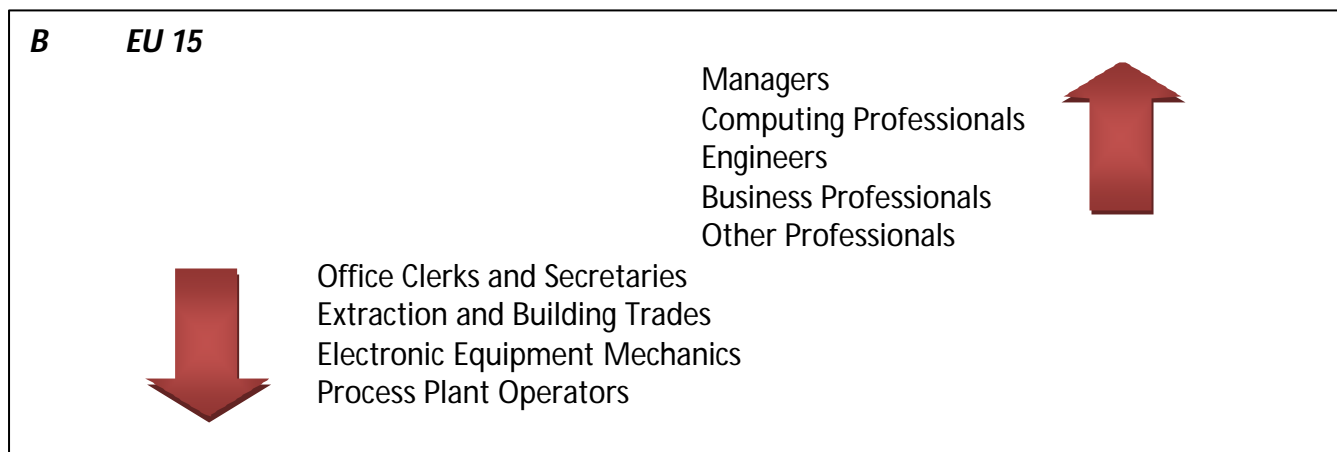
⁵⁶ “Future skill needs in Europe” Cedefop (2008)

The table above highlights the occupational changes within the EGW sector from 2000 to 2006. It shows that there has been an increase in the numbers of people employed within a number of EGW occupations and at the same time a decrease in the numbers employed in others. If current trends continue, the data in the above table illustrates that in the future, within the energy sector as a whole:

- There will be a requirement for more engineers, across all EU states
- There will be small growth and heavy decline of Other Professionals in the EU15 and NMS respectively
- There will be a need for less Office Clerks and Secretaries across all EU states
- Within the EU15 there will be less need for Electronic equipment mechanics, yet a growth in these occupations in the NMS
- Process Plant Operators will be required in greater numbers in NMS but slightly less in the EU15

The information contained in the boxes below (figure 4) has been constructed from the data in the above table to give a number of probable conclusions for the future of the sector about the future demand for these occupations. Upward facing arrow denotes an increase in number of employees in the given occupations, a downward facing arrow the reverse:





Changing skills within occupations - the picture in the UK (Figure 5)

Given that the UK gas market is perhaps a more liberalised market than any other in Europe it may be useful to examine the trends in this sector in terms of skills within some key occupations. The examples below have been provided by Energy and Utility Skills, the UK Sector Skills Council responsible for the gas sector and illustrate the changing skills needs within occupations. The columns denote how important certain skills are perceived by employers within the UK gas sector and their relative importance to others (1 = the most important, 10 the least).

Metering

- Installation, maintenance, reading, technology and manufacture of meters.
- Technological changes are an important feature in this sector, with the switch from mechanical to electronic or 'smart' remote reading anticipated in the coming years.

Skill requirements – today and in the future

	Relative importance of Particular Skills		
	% V Important	Now Index	Future Index
Customer Care	81	1	1
Job Specific	81	2	2
Communication	69	3	3
Following Instruction	69	4	8
Team Working	63	5	5
Showing initiative	63	6	6
Problem solving	63	7	4
Being flexible	56	8	7
Literacy	69	9	9
Leadership skills	50	10	11



Problem solving
Being flexible

Following instructions



Contracting and maintenance

- Distribution contractors, self lay pipe laying, gas equipment manufacturers
- Observations in the UK gas sector suggest that a number of these organisations have transferred to other utility sectors, but many still service and support a number of utilities, spreading their risk. These organisations will need to anticipate skill needs and form strategic partnerships with gas transporters.

Skills requirements – today and in the future

	Relative importance of Particular Skills		
	% V Important	Now Index	Future Index
Showing initiative	89	1	1
Being flexible	77	2	2
Job specific	77	3	3
Communication	77	4	5
Problem solving	73	5	4
Following instructions	73	6	6
Team working	73	7	7
Literacy	58	8	8
Customer care	65	9	9
Leadership skills	58	10	12



Problem solving

Communication



Gas Suppliers

- Includes gas shippers and gas suppliers. Liberalisation of the UK gas market has led to a proliferation of Gas Suppliers, and the industry exhibits the signs of an immature market so rationalisation is predicted in the future.
- Since liberalisation these companies now face competition from retailers and as a result need to acquire skills such as communication and customer care skills.

Skills requirements – today and in the future

	Relative importance of Particular Skills		
	% V Important	Now Index	Future Index
Showing initiative	78	1	4
Being flexible	78	2	2
Problem solving	76	3	3
Job specific	78	4	1
Communication	74	5	6
Following instructions	77	6	7
Customer care	79	7	5
Team working	72	8	8
Literacy	63	9	9
Basic IT skills	49	10	10



*Job specific skills
Customer care*

*Showing initiative
Communication
Following instructions*



Manufacturer / Retailers

- Manufacture and retailing of gas appliances (commercial and industrial)
- This sub sector generally faces the same challenges as the manufacturing sector as a whole and that is competition from low labour cost countries. In the UK it is felt that manufacturers will rely increasingly on retailers for installation and maintenance of gas appliances. Mechanical technologies are being replaced by electronic, demanding new skills of workers in this area.

Skills requirements – today and in the future

	Relative importance of Particular Skills		
	% V Important	Now Index	Future Index
Problem solving	80	1	3
Being flexible	82	2	1
Showing initiative	75	3	5
Communication	73	4	4
Job specific	77	5	2
Follow instruction	75	6	7
Customer care	82	7	6
Literacy	59	8	9
Team working	73	9	8
Basic IT	50	10	10
Environment	50	11	11



*Being flexible
Job specific
Customer care*

*Problem solving
Showing initiative
Following instructions*



Gas Installers

- Installation and maintenance of gas appliances, for domestic, commercial and industrial use
- A large number of this category of companies undertake work in another utility sector in addition to gas – water and electricity
-
-

Skills requirements – today and in the future

	Relative importance of Particular Skills		
	% V Important	Now Index	Future Index
Job specific	87	1	1
Customer care	86	2	2
Problem solving	80	3	3
Being flexible	80	4	4
Communication	73	5	5
Showing initiative	71	6	7
Literacy	68	7	6
Following instructions	75	8	8
Environment	55	9	9
Team working	51	10	11

The increasing demand for job specific skills in the future for both Gas Suppliers and Manufacturers and Retailers, in the UK, means that employers will need to establish training programmes specifically for these roles within their company and this in turn will require greater investment in training. Employees working within these fields will require training once recruited. This complements this research by emphasising the company specific initiatives that must be undertaken by European gas employers.

Analysis of the surveys

As the European gas sector is a fundamental part of the European labour market, it is possible to state that the European labour market trends identified in this report will affect this sector. However it is difficult to assess the implications of these identified trends if we are unaware of employers' attitudes and responses to them. If we assume that the returned surveys are indicative of the attitudes and the awareness of employers generally across the sector it is possible to conclude that the majority of employers are not taking the necessary steps to deal with the massive changes ahead.

The majority of company responses highlighted that 20 to 30 per cent of their workforce is aged 50 or over. This means that over the next decade more than a fifth of their workforce will retire, jeopardising their skills and knowledge base and, ultimately, their long term

future. In fact almost 70 per cent of gas companies surveyed stated that at least 30 per cent of their workforce was aged 50 or more. What is even more worrying is the fact that many of the companies have failed to introduce any procedures to resolve this issue and a large number had no even held discussions with the relevant trade unions, as the table below shows.

Table 22: Responses from Employers and Trade unions regarding various issues

Workforce > 50 years		Jobs affected*		Steps taken	
Up to 20 %	27%	Engineering	80%	None	20%
21 to 30 %	60%	I.T	30%	Discussions only	54%
31% to 40 %	6.5%	Commercial	30%	Specific Initiatives	13.5 %
> 41 %	6.5%	Administration	10%	Agreements reached	13.5%

* A number of respondents cited more than one job type

Given the evidence gathered in this study, these responses are hardly surprising and even consistent with this research. Large chunks of the gas sector workforce will retire over the coming decade and there will be a greater demand for engineers. From the responses it is clear that employers and trade unions need to set aside time and resources to properly study the effects of the sector’s ageing workforce and adequately address them jointly.

Figure 5: What percentage of your workforce are over 50 years of age ? (Employers only)

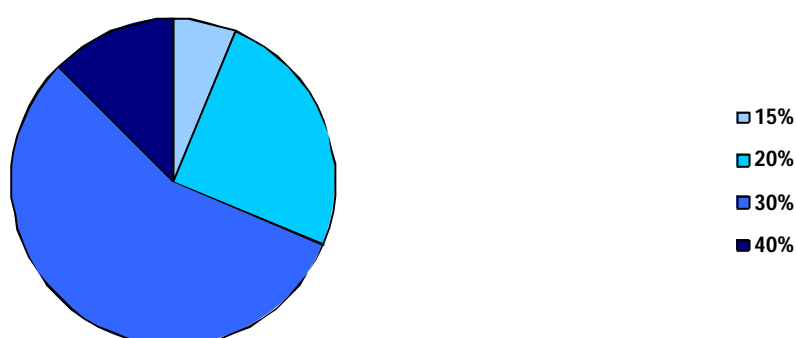
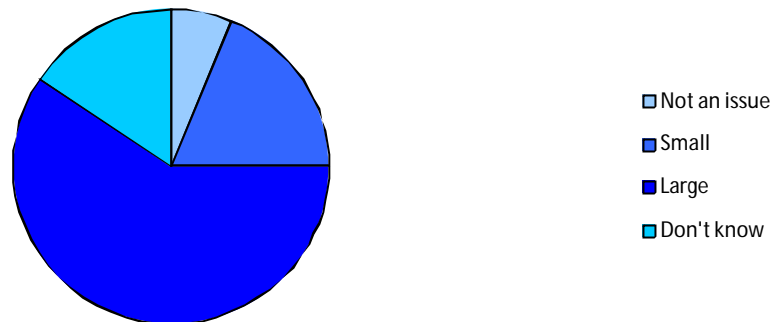


Figure 6 : The scale of the problem (Employers and trade unions)



The majority of respondents stated that the impact of demographic change on changing job functions and future skill needs was a large problem. If the surveys are indicative of the European gas industry generally then they reveal that a large chunk of the workforce in many gas companies will be retiring over the coming decade, despite the increase in the age at which workers retire (see page 18). This has implications for the future of these companies and the industry itself unless these workers are not only replaced, but adequate succession planning is undertaken - older, more experienced workers, transferring their knowledge, on to younger workers is crucial. However ensuring there is an appropriate environment for older workers to pass their knowledge and skills to younger workers doesn't necessarily mean that older workers must remain in work longer. In fact employers need to plan ahead of time and ensure there is adequate time prior to retirement for the process of knowledge transfer to take place.

There was a common theme running through the responses in relation to what the social partners saw as the key challenges for the sector over the coming years. A large proportion of the survey respondents, from both trade unions and companies, placed an emphasis upon recruiting and retaining younger workers and retaining older workers. Of those employers who stated that they understood the problems facing their company, and given the choice between suggesting that changing demographics will cause a large problem and a small problem, the majority of employers stated that they face a large problem.

Table 23: Challenges for the future in the gas sector

Challenge	% of respondents
Updating the skills of older workers	45%
Retaining older workers in the company	21%
Recruiting and retaining younger workers	59%
Knowledge Transfer	83%
Forecasting skills and planning for the future	48%
Getting the issue of demographic change onto the bargaining table	17%

The table above highlights the number of respondents that thought a particular issue was a challenge for ‘age-management’ for the future of the sector. Despite the European Commission’s objective to increase the participation rate among older workers, gas sector employers didn’t see this as a priority and only a fifth of employers saw this as a challenge. This raises important questions about how the gas sector intends on increasing the participation rate of older works in order to combat demographic changes.

Interestingly less than a quarter of respondents considered that retaining older workers was an issue, quite possibly because their focus is on knowledge transfer - that is the passing of knowledge and experience from older workers to younger workers. However as research shows beyond 2020 this alone will not be adequate to safeguard the industry and to ensure the industry has an adequate supply of skilled labour. The most important issue for the future, according to the responses, is how companies undertake this process. Rather worrying is the fact that less than 40 per cent of respondents stated that they had introduced any kind of programme for either mentoring or knowledge transfer. The majority of respondents stated that there was no programme in place despite this, collectively, being the sectors’ social partners biggest fear for the future of the sector.

Those companies and trade unions surveyed were asked about current initiatives being undertaken, either jointly or unilaterally, which attempt to forecast future skill requirements. Interestingly only 19 per cent of employers stated that their company had NOT introduced any initiatives to forecast future skills and competencies, yet 64 per cent of trade union

respondents replied this way. This suggests that many employers have introduced initiatives to forecast future skills and competencies but did not involve the trade union.

The overwhelming majority of the questionnaire respondents stated that in their opinion their company faced problems due to demographic change and that these problems will manifest themselves within the next decade, or even sooner. Only two respondents cited that they didn't expect any impact due to demographic change. Interestingly trade union respondents were more likely to feel that the problems associated with demographic change were more likely to impact on companies within the next 5 years while employer representatives felt that their company didn't expect to feel the impact of demographic change for another two or three decades. While a number of countries stated that they had begun acting to limit the effects of demographic change upon their business, these actions had been carried out largely without trade union involvement. Given the added value on this issue of representatives of employers and employees working together for a common goal, this is perhaps both surprising and disappointing.

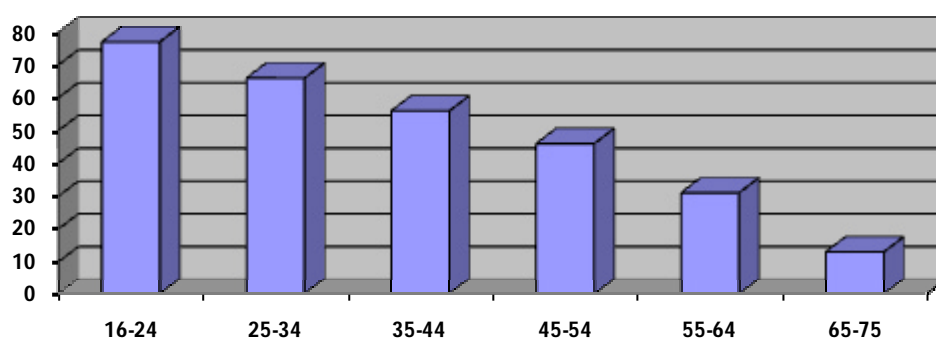
According to both employees' and employers' representatives the main category of jobs which respondents felt would be most affected by demographic change within the workplace are those involving engineering and the use of IT. The latter is hardly surprising given the huge impact this area of work has had on all types of businesses over the last decade, and the projected job landscape which suggests a greater use of IT in the future. If the simple use of a search engine is examined then it becomes apparent at the range of knowledge between age ranges. For example a far higher percentage of the EU27 population has used a search engine on the internet to find information or sent emails with an attachment among the 16-24 age range than in any other age range. This illustrates the skills gaps within IT usage which will prevent individuals feeling comfortable with a computer and gaining the most from working with a computer.

Evidence suggests that a greater use of ICT within routine work reduces labour input, yet increases in the use of ICT for non-routine work increases the need for higher skills⁵⁷. In fact the Skill-Biased Technological Change (SBTC) theory suggests that new technologies which improve the effectiveness and efficiency of the production process, for example information and communication technology (ICT), are 'skill biased' and therefore technological change

⁵⁷ Autor, Levy and Murnane (2003)

increases the demand for higher educated workers. At the same time less educated workers become relatively less productive and are less in demand reducing their wages and increasing the likelihood of them experiencing unemployment⁵⁸. Within the context of the gas sector, and the greater usage of IT for the work, this may require firms to spend time up-skilling lower skilled workers, with general and transferable skills to ensure their employment within the sector, as it is these workers and this skill-set that provides employers “with a better capacity for radical innovation, while education and training systems offering sector-specific courses and curricula favour incremental innovation”⁵⁹.

Graph 10: Percentage of individuals within EU27 who have used a search engine or sent an email with an attachment⁶⁰



The challenges posed by climate change

Policies at national and European levels relating to climate change are being pursued in order to ensure that European companies act early enough to ensure they remain competitive and in the long term stay ahead of their global competitors. Engaging their workforce now is vital if energy firms are to achieve this and climate change is a vital element of the changing nature, composition and skills landscape of energy workforces across Europe. Research suggests that, in terms of climate change, the key driver for companies operating within the energy sectors is regulation⁶¹. A recent report by GHK⁶² stated that in the seven sectors studied, including the energy sector, the overall conclusion was that the impact of climate change “tended to be in relation to skills rather than on the actual levels of employment”. The report also concluded that there is a general need for up-skilling in relation to climate change, and

⁵⁸ Machin and van Reenan (2007)

⁵⁹ “Technological Change, Inequality, and the Labor Market.”, Acemoglu D (2002)

⁶⁰ Source: Eurostat website (last viewed on 23rd June 2009)

⁶¹ Impact of climate change on European employment and skills short to medium term”, GHK, (2008)

⁶² “Impact of climate change on European employment and skills short to medium term”, GHK, (2008)

that new training programmes, especially technical training programmes, were required for companies to maintain their competitiveness. A further point mentioned in the report is the necessity for employers to engage early with their workforces to “raise their awareness, and to build the capacity of staff through the acquisition of skills and training”. Of course a company acting on these issues in isolation will be less likely to survive in the long term compared to one which works with its supply chain and their employees. Interestingly of all the companies studied in the GHK report only those in the energy sector had not introduced environmental training programmes for their workforce to raise the awareness of environmental and climate change.

Projections for Gas Sector Occupations

It is possible from the data in this chapter to project the likelihood of rises and falls in a number of key gas sector occupations and this has been carried out below.

Exploration and allied trades

The need to ensure security of supply coupled with the sectors’ growth will mean that exploration will continue to play a vital role, and those workers employed in occupations allied to these operations will continue to be required and replenished when they retire.

Distribution Workers

Evidence shows that these workers are adversely affected by liberalisation in the energy sectors.

Customer services

These occupations are unlikely to grow in those countries which already have a liberalised gas sector due to the reduced possibilities of growth. On the contrary if, as the UK market suggests, that energy providers within mature liberalised markets tend to ‘overlap’ their operations (see page 52), there may well be a reduction in these occupations as electricity firms and gas firms use common customer service platforms.

Engineers

Due to the likely growth within the power plant sub sector, the number of engineers required in the coming years will increase. However as the demand, according to Cedefop (see page 41), for technical and craft related workers is due to decrease across the board, gas sector

employers ought to be able to provide the necessary number of engineers from the existing European pool of labour.

Plant operators

If the size of the power plant sub sector grows, as is expected, and the demand across Europe for these workers decreases, gas companies ought to be able to adequately fill their requirements from existing workers. Evidence shows that Process Plant Operators will be required in greater numbers in NMS but slightly less in the EU15.

Meter readers

These workers are the most likely to be affected by the recent changes in new technology that allow companies to remotely access data stored within residential or commercial users' premises. However there are opportunities for the social partners to work jointly to examine emerging roles allied to energy saving which this group of workers may be in a position to fill.

Scenario building

Being successful in the future will mean not just satisfying the needs of young aspiring adult workers so that they seek employment in the sector, but also that gas sector employers continually maintain this environment so the gas sector becomes a career choice. As we have seen in the UK gas market, many companies now operate within boundaries beyond simply gas. These companies work with other utility and energy providers where economies of scale are not just achieved by sheer size, but, where work organisation and skills are similar, by covering more than just gas or electricity in overlapping competencies. This could result in job losses over a period of time as rationalisation takes place as the liberalised gas sector matures. Thus an engineer may find similarities between the tools and processes in both gas and nuclear energy production.

Due to the impossibility of precisely forecasting the demographic profile and the skills landscape, within the European gas sector, in the coming years it is necessary to construct a number of scenarios.

Both scenarios assume the following trends:

- *Current trends in ageing and skills continue*
- *More gas is used for generating power*
- *Residential and commercial gas usage is reduced due to greater awareness of the effects climate change*

As Europe's population becomes even more aware of the impact of global warming, residential and commercial users will consume less gas, particularly as a result of better insulation, and this will require fewer workers employed in those occupations linked to the delivery and the servicing of residential and commercial users. The demand for so called 'front line' occupations, such as customer service workers, will be reduced as a direct result. In addition, 'smart' meter reading will become more commonplace and so demand for workers who were employed in meter reading jobs will fall. However, with exploration and production increasing, due to the demand for power generation by gas increasing, there will be greater demand for those workers skilled to undertake occupations in these areas.

Gas companies need to urgently establish a strategy for the period until 2020 when, predicts the European Commission, the labour market will tighten considerably, resulting in insufficient workers for vacancies. Gas companies will need to introduce, and monitor, in-house age management systems and training programmes to ensure their workforce is being replenished by younger workers. This will involve a greater effort in promoting employment in the gas sector as a career of choice and offering workers continuous personal development and high quality jobs to reduce them leaving. Of course, waiting until 2020 is not an option. If they are not doing so now other sectors, particularly the IT and other scientific based sectors, will be competing with the energy sector for these workers. As we begin to see greater use of 'overlapping', as has been experienced in the UK, of 'energy occupations' servicing more than one kind of energy source, gas, electricity and nuclear sector employers may need to consider a joint sector approach to organising future recruitment strategies.

Scenario A

Employment practices continue at current rates.

In this scenario, the social partners fail to act collectively or strategically and instead rely on ad hoc change at the local level. In the build up to 2020 employers will witness greater

difficulties in recruiting the right workers with the right skills. Gas sector employers, like those within other energy sectors, will face severe skills gaps and shortages forcing a slump in productivity just as more gas markets are being liberalised, which will have a number of negative effects upon the existing companies:

- Competition from other companies traditionally outside of the gas sector
- Employment relations may suffer as a result of lower productivity as employers attempt to hold wages down to compensate
- Pension funds will come under pressure as more and more workers retire early, forcing a radical rethink of the pension provision by gas companies
- Off shoring and outsourcing will generate tension between employees as different employers attempt to introduce different payment systems based on their own company policies
- Users of gas, experiencing a poor service, switch to other forms of energy supply, either dramatically contributing to worsening climate change or boosting employment on renewable, further weakening employee commitment within the gas sector
-

The social partners locally work constructively to introduce measures over the coming decade to alleviate pressures caused by the retirement of those workers due to retire in the next ten years. Knowledge transfer programmes are introduced and experience and knowledge is passed from the older workforce to the newer younger recruits. Of course this can only take place if gas companies recruit and retain young workers. The gas sector must be seen by this younger cohort as a modern, attractive sector to work within and lifelong learning opportunities must be established, based on employee willingness as well as business needs, in order to retain this group of workers. However given the rates of training within the sector and the record so far of national lifelong learning strategies, progressive change may not be enough to overcome the challenges the sector faces.

Scenario B

Radical Change

Companies and trade unions work in partnership to take into account all the issues raised in this study, and rapidly so. These changes must address the challenges thrown up by the effects on skills and occupations from climate change and energy usage, the low rates of participation among female workers, the low participation rate of low skilled workers in training and lifelong learning opportunities, ensuring there is opportunity for older workers, if they choose, to stay at work longer, and generally making a career in the gas sector a career of choice. This option will require a rapid amount of activity and is unlikely to be sustained in the long term. The arrival of 2020 will have very little impact upon the productivity, performance and employment within the sector, further strengthening the case for adults pursuing gas as a sector of choice for their career. This will mean that other sectors employing workers with gas sector type skills will be unable to recruit workers as unable to compete with gas as a source of energy. From 2020 the gas sector continues to lead on changing its employment practices and good social dialogue ensures compliance from the workforce.

The first scenario is extreme in nature but nevertheless possible if nothing is done within the gas sector to combat the issues raised in this study. It is of course possible that other sectors will act, and governments may introduce compulsory measures to ensure employers act in time to avert a real shortage of labour over the coming decades. However the gas sector social partners cannot risk this happening and must take the matters into their own hands. The second scenario, although rather ambitious, does offer the gas sector some hope for the future. It will place employers ahead of their competitors and ensure their survival, not only as a leader in the energy sectors, but as an employer of choice more generally.

The European gas sector has experienced changes due to the liberalisation measures undertaken, to a lesser or greater extent, by EU member states. Although accounting for a very small amount of global gas reserves, due to its relatively high demand gas usage across the European Union remains relatively high. In the future demand for gas will increase within the EU, despite the increase in renewables, due to the demand for energy overall increasing. As a result Europe will need to continue to import gas from Algeria and Russia making security of supply an important issue. Despite the European Union's attempts to fully liberalise its gas markets there is inconsistency across the Union with a number of

countries' markets fully liberalised and other barely so. Social dialogue within the European gas sector has been formalised since 2007, with the unions and employers making an important contribution to the policy development within the Commission.

If the social partners are to ensure the sector's survival then a number of issues, specific to the European gas sector, must be addressed and these include tackling the ageing workforce, increasing the number of women in the sector, addressing the impending (if not current) skills gap, addressing the challenges the environmental agenda brings and offer employees support for training throughout their working lives. This study, and the accompanying toolkit, is part of that process. The following chapter will seek to outline the possible changes to the sector over the coming two decades, in terms of the industry's structure, skills and demographics.

Conclusions

Like all other parts of the European economy, the gas sector is experiencing technological change and this will continue. The sectors' strength lies in the fact the social partners are both committed to alleviating the threats posed by demographic change and this is vital given the necessity for change, but also given the requirement for employee support for this change, especially concerning the controversial issues such changing retirement practices and other traditional employment methods.

This section has attempted to highlight the likely future trends based on current published research and responses to the questionnaire completed by trade unions and employers within the sector. It has also tried to highlight a number of key occupations and the impact of skills and competencies on them. Fortunately for the sector, the many negative impacts of the ageing population twinned with projected changes in demand for workers and their skills, although not reversible, can be mitigated and in some cases solved. However this implies a full scale reassessment of working life within the European gas sector and the establishment of a long term and holistic programme of activity and joint work. Given the different stages of liberalisation and the consequent variations in the sector's operations, needs and requirements, the most difficult process is co-ordinating, monitoring and evaluating the actions of the social partners at all levels.

There are three stages through which the effects on individuals and employers of the ageing workforce within the sector will be played out:

A 2004 to 2012

During this current period, employers will find it easier to fill skill gaps and shortages than in the coming years. At this point gas sector employers need to begin mapping out their future requirements and embarking on strategic plans to ensure their survival over the next two periods. This period ought be dedicated to ensuring training measures are in place and that employment practices are established to weather subsequent stages.

B 2013 to 2019

This is the period in which companies will begin to witness the tightening labour market and will begin to find it difficult to find the right skills for their businesses. If employers have failed at this point to establish the foundations of in house strategic training programmes and

newer forms of employment practices outlined in this report their business will begin to feel the economic pressures as the impact of older workers retire with less workers replacing them bites.

C 2020 onwards

At this point the ageing effect across Europe will be felt the hardest and it is throughout this period in which the number of people of working age drops, despite improvements in participation rates, and employers will literally be competing with each other to recruit the right number of people with the right skills. From 2020 onwards those employers, who have taken no steps to tackle the ageing effect, will quite literally be fighting for their survival.

APPENDIX A

Measures and legislation introduced by the European Commission covering the energy sector

Initiative	Objectives
European Energy Policy	The aims of the policy are supported by market-based tools (mainly taxes, subsidies and the CO ₂ emissions trading scheme), by developing energy technologies (especially technologies for energy efficiency and renewable or low-carbon energy) and by Community financial instruments.
Internal Energy Market	To create an internal market for energy is a priority for the European Union and is about giving European consumers a choice between different companies supplying gas and electricity at reasonable prices, and of making the market accessible for all suppliers, especially the smallest and those investing in renewable forms of energy. There is also the issue of setting up a framework within which the mechanism for CO ₂ emission trading can function properly. Making the internal energy market a reality will depend above all on having a reliable and coherent energy network in Europe and therefore on infrastructure investment.
Energy Efficiency	Reducing energy consumption and eliminating energy wastage are priorities of the European Union. EU support for improving energy efficiency will prove decisive for competitiveness, security of supply and for meeting the commitments on climate change made under the Kyoto Protocol. There is significant potential for reducing consumption, especially in energy-intensive sectors such as buildings, manufacturing, energy conversion and transport. At the end of 2006, the EU pledged to cut its annual consumption of primary energy by 20% by 2020.
Renewable Energy	Renewable sources of energy – wind power, solar power (thermal and photovoltaic), hydro-electric power, tidal power, geothermal energy and biomass – are an essential alternative to fossil fuels. Using these sources helps not only to reduce greenhouse gas emissions from energy generation and consumption but also to reduce the European Union's (EU) dependence on imports of fossil fuels (in particular oil and gas). In order to reach the ambitious target of a 20% share of energy from renewable sources in the overall energy mix, the EU plans to focus efforts on the electricity, heating and cooling sectors

	and on biofuels. In transport, which is almost exclusively dependent on oil, the Commission hopes to increase the current target of a 5.75% share of biofuels in overall fuel consumption by 2010 to a 10% share by 2020.
Nuclear Energy	Nuclear power stations currently produce around a third of the electricity and 15% of the energy consumed in the European Union (EU). The sector represents a source of energy with low carbon levels and relatively stable costs, which makes it attractive from the point of view of security of supply and fighting climate change. It is up to each Member State, however, to decide whether or not to pursue the option of nuclear power. The ground for nuclear energy in Europe was laid in 1957 by the European Atomic Energy Community (Euratom). Its main functions consisted of furthering cooperation in the field of research, protecting the public by establishing common safety standards, ensuring an adequate and equitable supply of ores and nuclear fuel, monitoring the peaceful use of nuclear material, and cooperating with other countries and international organisations. Specific measures adopted at EU level are geared to protecting the health of those working in the sector and of the public at large, and protecting the environment from the risks associated with the use of nuclear fuel and the resulting waste.
Security of supply	If it is to achieve its goal of secure, competitive and sustainable energy the EU must involve and cooperate with developed and developing countries, be they producers, transit countries or consumers. For the sake of efficiency and consistency, therefore, the EU and the Member States must speak with one voice on international energy issues. At a time of vulnerability of imports, potential energy crises and uncertainty surrounding future supplies, the EU must make sure that it adopts measures and creates partnerships that guarantee the security of its energy supply. Compliance with the Community energy acquis by the candidate countries is a vital part of the process of their accession to the EU.

APPENDIX B

Demand for occupations and number of employees within Europe, extracted from Cedefop's forecasting study, and their expected trends in the coming years.

Occupations	Levels (000s)			Growth (% p.a.)	
	1996	2006	2015	1995-06	2006-15
Legislators, senior officials and managers	15 394	18 405	21 076	1.8	1.5
Legislators and senior officials	484	495	596	0.2	2.1
Corporate managers	8 349	9 920	12 346	1.7	2.5
Managers of small enterprises	8 349	7 990	8 135	2.0	0.2
Professionals	24 220	27 349	31 111	1.2	1.4
Physical, mathematical and engineering science professionals	5 518	6 401	7 452	1.5	1.7
Life science and health professionals	3 698	3 551	3 658	-0.4	0.3
Teaching professionals	7 862	8 464	8 736	0.7	0.4
Other professionals	7 143	8 933	11 265	2.3	2.6
Technicians and associate professionals	27 643	33 952	38 691	2.1	1.5
Physical and engineering science associate professionals	6 911	7 715	8 129	1.1	0.6
Life science and health associate professionals	4 807	5 618	5 800	1.6	0.4
Teaching associate professionals	2 126	2 660	3 315	2.1	2.7
Other associate professionals	13 799	18 013	21 446	2.7	2.0
Clerks	24 632	23 317	22 044	-0.5	-0.6
Office clerks	20 840	18 795	16 944	-1.0	-1.1
Customer services clerks	3 792	4 522	5 100	1.8	1.3
Service workers and shop and market sales workers	25 385	29 490	32 017	1.5	0.9
Personal and protective services	15 408	18 848	21 361	2.0	1.4
Models, salespersons and demonstrators	9 977	10 642	10 656	0.6	0.0

Skilled agricultural and fishery workers	9 829	7 789	6 082	-2.3	-2.7
Craft and related trades workers	30 641	28 845	27 420	-0.6	-0.6
Extraction and building trades workers	11 205	12 597	12 718	1.2	0.1
Metal, machinery and related trades	11 976	10 466	9 555	-1.3	-1.0
Precision, handicraft, craft printing and related trade workers	1 865	1 444	1 171	-2.5	-2.3
Other craft and related trades workers	5 595	4 338	3 977	-2.5	-2.3
Plant and machine operators and assemblers	17 069	17 314	17 850	0.1	0.3
Stationary plant and related operators	2 034	2 103	2 079	0.3	-0.1
Machine operators and assemblers	6 622	6 498	6 596	-0.2	0.2
Drivers and mobile plant assemblers	8 414	8 713	9 175	0.4	0.6
Elementary occupations	16 655	22 980	26 480	3.3	1.6
Sales and services elementary occupations	10 408	15 568	18 630	4.1	2.0
Agricultural, fishery and related labourers	1 269	1 249	1 116	-0.2	-1.3
Labourers in mining, construction, manufacturing and transport	4 978	6 163	6 735	2.2	1.0
All industries	192 714	210 656	223 936	0.9	0.7

APPENDIX C

The European Commission has set out the definitions of the various terms used within the debate on competencies, and they are as follows:

- **Knowledge** refers to the outcome of the accumulation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. In the context of the European Qualifications Framework, knowledge is described as theoretical and/or factual;
- **Skill** refers to the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments);
- **Competence** refers to the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competence is described in terms of responsibility and autonomy;
- **Qualification** refers to a formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards;
- **Learning outcomes** refer to statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence.

Source: EQF (European Commission, 2008e; European Commission, 2008f)

APPENDIX D

Total employment in EU27 (000s) by occupation (ISC classification)

Occupation	ISC Classification	Numbers
2006		
Elementary ISC03	09	19269.9
Skilled manual ISC06-08	06-08	43655.4
Service workers ISC05	05	26029.4
Clerks ISC04	04	22397.3
Managers etc ISC01-03	01-03	65012.5
All workers aged 15-64		
	00	1389.2
Q4 2006 (15-64)	01	10057.4
EU27	02	24397.5
	03	30557.6
	04	22397.3
	05	26029.4
	06	1755.3
	07	24747.7
	08	17152.4
	09	19269.9
	00	1446.0
Q4 2007 (15-64)	01	10263.0
EU27	02	25098.1
	03	31559.3
	04	22784.5
	05	26634.5
	06	1781.5
	07	25236.6

	08	17562.5
	09	19673.5
	00	1410.8
Q4 2008 (15-64)	01	10683.6
EU27	02	25768.7
	03	32174.5
	04	22926.2
	05	27084.5
	06	1761.2
	07	24830.9
	08	17180.6
	09	19556.1

APPENDIX E

The number of employed people in EU27 according to occupation type (2008) extracted from Cedefop's study.

ISC ⁶³	Occupation	Numbers (000s)
00	Armed Forces	1410.8
01	Legislators, senior officials and managers	10683.6
02	Professionals	25768.7
03	Technicians and associate professionals	32174.5
04	Clerks	22926.2
05	Service workers and shop and market sales workers	27084.5
06	Skilled agricultural and fishery workers	1761.2
07	Craft and related trades workers	24830.9
08	Plant and machine operators and assemblers	17180.6
09	Elementary occupations	19556.1
01, 02, 03	Managers, professionals, technicians and associate professionals	68626.8
06, 07, 08	Skilled manual workers	43772.7

⁶³ The classification of occupation uses ISCO-88 codes and are taken from Eurostat

APPENDIX F

Communications from the European Commission affecting Gas production

European Gas Market legislation 1998 and 2003 – market liberalisation
Green Paper: A European strategy for sustainable, competitive and secure energy 2006
Directive (<u>2003/55/EC</u>) for common rules for the internal market in natural gas 2003
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