

GREEN JOBS: EMPLOYMENT POTENTIAL AND CHALLENGES

The April 2012 Employment Package identified the green economy as a key source of job creation in Europe. According to estimates, implementation of energy efficiency measures could lead to 2 million jobs being created or retained by 2020 and the development of renewable energy sources could lead to 3 million jobs by 2020. ¹ Yet, policies towards greening of the economy may have an impact on employment in carbon-intensive sectors or require adaptation of skills and working methods. Hence, ensuring that the skills required in emerging green sectors are anticipated and developed, as well as promoting employment preservation in traditional industries in the shift to a low-carbon and resource efficient economy, result as essential policy actions in order to harness the job creation potential of the greening of our economy.

1. Key Statistical indicators

'Green jobs' cover *"all jobs that depend on the environment or are created, substituted or redefined in the transition process towards a greener economy"*.² Such a broad definition accounts for the fact that regulatory and technological changes linked to the shift towards a resource efficient and low-carbon economy have far-reaching implications for a vast range of occupations. To better specify the focus of the green jobs agenda, we can identify two distinct sectors associated with particular challenges:

- a) Development of "green jobs" in eco-industries
- b) Supporting the "greening" of traditional industries.

Although skills management represents an outstanding policy challenge in both cases, available evidence suggests treating the two domains differently.

a. Development of Green Jobs in Eco-Industries

"Eco-industries" encompass a heterogeneous set of sectors in the fields of *environmental protection* (e.g. waste management) and *resource management* (e.g.

¹ ECORYS (2012), The number of Jobs dependent on the Environment and Resource Efficiency improvements" (<http://ec.europa.eu/environment/enveco/jobs/pdf/jobs.pdf>); SWD (2012) "Exploiting the Employment Potential of Green Growth", 92final, 18.4.2012.

² SWD (2012), quoted.

renewable energy, renewable raw materials and products).³ Around 2.7 million people worked in the EU-27 eco-industry in 2008 which represented 1.22% of total employment (people aged 15 - 64). In 2012, the total number of people working in eco-industries is projected to be around 3.4 million.⁴

However, **we lack a systematic collection of data on the development of eco-industries in the EU.** Eurostat provides a database on the *Environmental Goods and Services Sector* (EGSS). Despite continuous improvement efforts, available data are still fragmented and incomplete, as employment data cover only six countries (DE, FR, NL, AT, RO, SE) in sparse years.⁵ To remedy this lack of information, we need to focus on specific sectors.

- **Water collection, treatment and supply** (NACE E36); **sewerage** (E 37); **waste collection, treatment and disposal activities; materials recovery** (E38); **remediation activities** and other waste management services (E39) represent the sectors for which Eurostat provides a more complete and reliable data collection at the present time.
- In 2011, **these four sectors employed around 1.6 million workers in the EU, which made up 0.77% of total employment (15-64).** The incidence of these sectors on total employment noticeably differs across EU countries. As shown in figure 1, it ranges from less than 0.5% (in Cyprus, Denmark, Netherlands, Finland and Sweden) to over 1% in Slovenia, Slovakia, Hungary and Bulgaria. Higher employment shares in these sectors should be nevertheless weighted against labour productivity and energy efficiency of these industries in order to gain a full picture of their state of development across the EU.

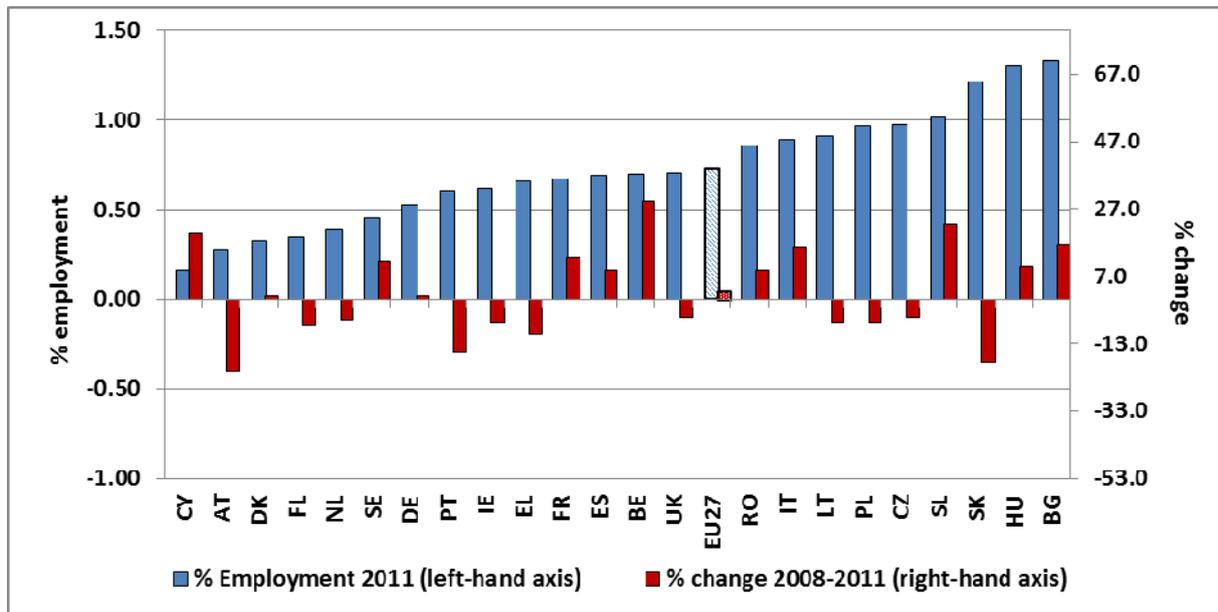
³ Eurostat defines eco-industries as “*activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes technologies, products, and services that reduce environmental risk and minimize pollution*”. (Eurostat (2009), *The environmental goods and services sector. A data collection handbook*, available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-09-012/EN/KS-RA-09-012-EN.PDF). In a more recent study, ECORYS (2009) further distinguished between "core" and "connected" eco-industries, identifying the former as those sectors within which environmental protection and resource management represents the *primary purpose* of their activities and the latter as their supply chain (e.g. mechanical engineering, electronic equipment, chemicals, aerospace, automotive industry, steel, metal working industries, ceramics, glass, ICT, paper) (http://ec.europa.eu/enterprise/newsroom/cf_getdocument.cfm?doc_id=5416).

⁴ Ecorys (2012), "The number of Jobs dependent on the Environment and Resource Efficiency improvements".

⁵ Nonetheless, some countries such as Austria, France or Germany have developed much more detailed information on eco-industries, and may provide a best practice for other EU countries to follow (cf. http://www.statistik.at/web_en/statistics/energy_environment/environment/eco_industries_environmentally_goods_and_services/index.html; and <http://www.umweltdaten.de/publikationen/fpdf-l/4308.pdf>).

- **Water and waste collection, sewerage, and remediation activities have withstood the crisis relatively well.** Between 2008-2011, employment grew by 45 000 jobs in the EU (+2.7%). However, percentage employment changes between 2008-2011 suggest that the crisis hit green sectors differently in a cross-country perspective. Whereas data show severe employment losses in Austria⁶, Slovakia, and Portugal during this period, other countries recorded remarkable employment gains, most notably in Belgium, Bulgaria, Sweden and Slovenia.

Figure 1. % share of employment in water collection, sewerage, waste collection, and remediation activities (2011), and % change (2008-2011)



Source: own calculations on LFS data for NACE 2 sectors E36, E37, E38.

Note: Estonia, Latvia, Luxembourg, and Malta are excluded due to missing data in all sectors. Data lack for the sewerage sector in the following countries: BE, BG, DK, IE, EL, FR, CY, LT, AT, PT, RO, SL, FL. Missing data are also recorded in the water management sector for AT and DK.

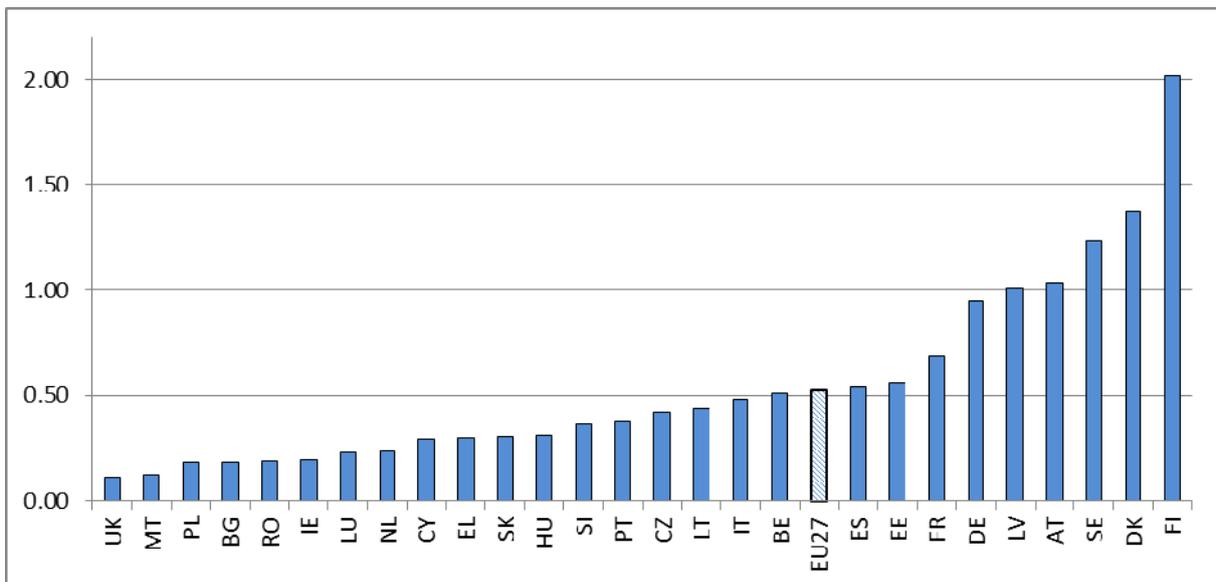
- The **renewable energy sector (RES)** represents one of the fastest growing sectors in Europe. Between 2005-2009, it contributed to the creation of more than 300,000 jobs.⁷ According to the European Observatory of Renewable Energy latest data, in 2010 RES employed about 1.1 million workers in the EU27 (0.5% of total employment). Within the RES, solid biomass, photovoltaic, and wind powers had higher numbers of employees across the EU (over 250,000 each). However, considerable differences were

⁶ Due to missing information, data on Austria only refers to the waste management sector.

⁷ European Renewable Energy Council, <http://www.erec.org/statistics/jobs.html>.

observable among the Member States. Germany, France, Italy, and Spain exhibited the highest number of employees in 2010, even though Finland, Denmark, Sweden recorded the highest shares on total employment (between 1.2 and 2%). Conversely, other countries such as the UK, Malta, Poland, Bulgaria, Romania, and Ireland witnessed the lowest employment incidence of this sector (below 0.2%).⁸ Figure 2 provides a picture of this situation.

Figure 2. Employment in the renewable energy sector as % share of total employment (2010)



Source: European Observatory on Renewable Energy 2011 – own calculations

- **Environment-dependent activities** based on natural resources (non-organic agriculture, organic farming, forestry, fishing, as well as mining, extraction and quarrying, renewable and non-renewable electricity generation and water extraction and supply) represent a further important source of direct, indirect and induced employment. In 2007, these sectors employed about 28.4 million individuals (in full-time equivalents) in the EU27, 16.7% of the EU working age population, of which 10.7 million in agriculture only. The employment share of environment-dependent sectors was highest most notably in Romania (60%), Bulgaria (40%) and Poland (about 32%), as well as in other central, eastern and southern countries such as Lithuania, Slovenia, Austria, Hungary, Portugal and Greece (over 20%).⁹

⁸ <http://www.eurobserv-er.org/>

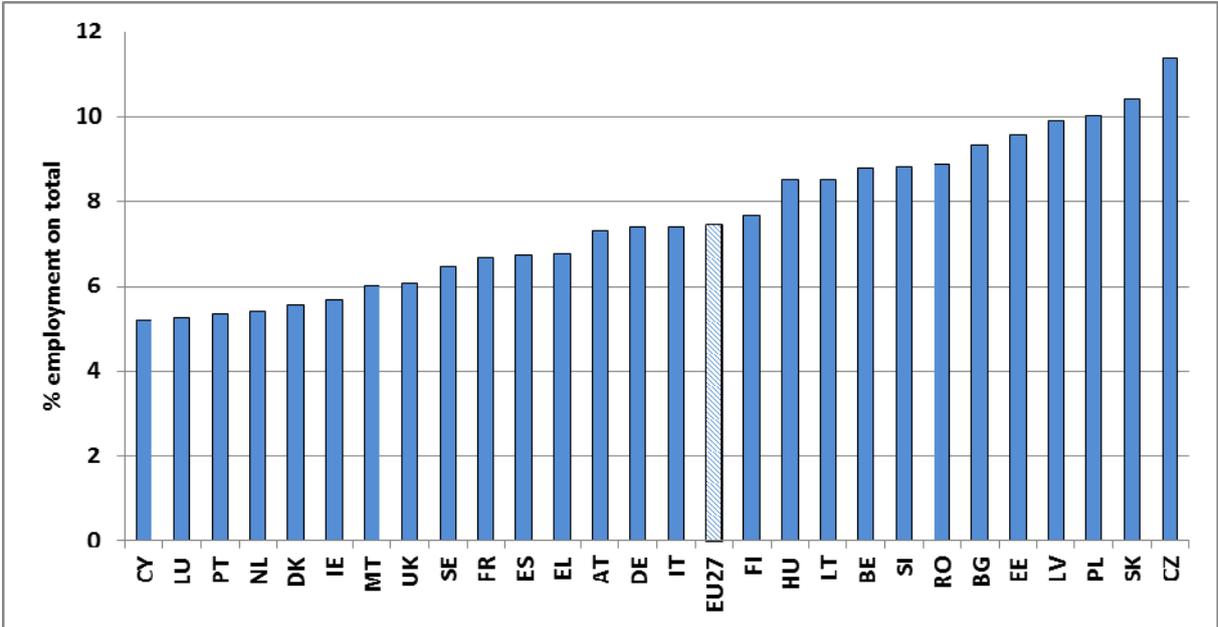
⁹ ECORYS (2012), p. 46 ff.

b. The "greening" of traditional industries

Meeting the EU2020 climate and energy targets implies increasing the greening pressures in emission-intensive industries. According to the European Environmental Agency, the source of 60% of the total GHG emissions in the EU is attributable to the energy supply (31,8%) and energy use (28.2%) sectors. Transports are responsible for 19.7% of the GHG emissions, whereas comparatively lower shares are recorded in industrial processes, agriculture, and waste.¹⁰

- **Green growth policies imply significant challenges for traditional industries with relatively high ratio of GHG emissions to value added.** A recent OECD report identified these industries: electricity, gas and water supply; water transports; air transports; coke, refined petroleum products and nuclear fuel; inland transports, supporting and auxiliary transport activities; other non-metallic minerals; basic metals; chemicals and chemical products.¹¹
- Figure 3 shows that, taken together, these emission-intensive industries made up 7.45% of total EU employment in 2011, about 15.8 million workers.

Figure 3. Employment % share of traditional industries in the EU27, 2011



Source: EU-LFS data, own calculations

¹⁰ EEA (2012), "Greenhouse gas emission: trends and projections in Europe – 2012." <http://www.eea.europa.eu/pressroom/publications/ghg-trends-and-projections-2012/>

¹¹ OECD (2012) "The Jobs Potential of a shift towards a low-carbon economy", pp. 44-49.

- **The Member States present significant differences in the incidence of emission-intensive industries on total employment.** The lowest share is recorded in Cyprus, Luxembourg, Portugal, the Netherlands, Denmark, and Ireland (below 6%), whereas the highest share was recorded in Czech Republic, Slovakia, and Poland (over 10%).

2. Assessment of the main challenges in the Member States

Exploiting the employment potential of the green economy requires policy action on three main fronts: boosting labour demand in eco-industries through adequate levels of investments, anticipating and managing skills needs in both green and greening sectors, and ensuring job quality for high-, medium-, and low-skill occupations. From the point of view of labour market policy, enhanced attention should be dedicated to devising adequate training programmes to tackle specific skill shortages, and to considering the dynamic interaction between skills supply and age structure of the workforce in green and traditional industries. These challenges bear different implications across sectors, as well as in different Member States.

a. Exploiting the Potential of Green Jobs in Eco-Industries

Employment growth in eco-industry sectors and related supply chains crucially depends on substantial green investments:

- In the **Energy Efficiency sector**, the European Commission's Impact Assessment for the Energy Efficiency Directive calculated that achieving the EU's 2020 energy efficiency target is expected to increase EU GDP by €34bn by 2020 and boost net employment. The construction sector in particular could see a significant boost from implementing the full range of measures required to raise energy efficiency by 20%, and see an increase of 400,000 new jobs.¹²
- Moving towards the milestones of the **resource efficiency roadmap on waste** could increase the benefits to 526.000 jobs and € 55 billion;
- The **renewable energy sector** may benefit of 2.8 million more jobs from the achievement of the related target in 2020;

¹² A large-scale renovation programme for energy efficiency in Germany had mobilised almost €100 billion since 2006 and maintained 300,000 jobs in the building sector, according to the ILO/UNEP study (2012), "Working towards sustainable development: Opportunities for decent work and social inclusion in a green economy".

- investments for € 200 billion in **sustainable land transports** could generate up to 650,000 additional jobs.

Restoring normal lending to the economy as well as the implementation of targeted stimulus measures may finally lead to the achievement of further employment gains in the production of renewable energy and products, manufacture of renewable energy equipment, production of biofuels, and of electric vehicles.¹³

In face of growing labour demand, however, **sustained training policies would contribute to tackling the most important skill bottlenecks**. First, a recent study by CEDEFOP¹⁴ stresses employers' claims of **skill shortages** for essential low-skill occupations to green and greening industries such as electricians, insulation workers, and sheet-metal workers. Table 1 provides an overview of this phenomenon by highlighting in dark the cells corresponding to the occupations where the main skill shortages are identified. Skill shortages are particularly acute in countries (Germany, the Netherlands, UK) where green industries are more developed. Policies may require a special dimension dedicated to make areas of study and occupations where skill shortages are particularly acute more attractive for women, as they remain underrepresented in areas of study such as life and physical sciences, engineering, manufacturing and construction.

Table 1. Reported skill shortage by country and occupation

	Nanotechnology Engineering technologist	Environmental Engineer	Energy Auditor	Transport Vehicle emissions inspector	Solar photo Voltaic Installer	Electrician	Insulation Worker	Sheet-metal Worker	Refuse collector
GR	+								
FI				+		+	+	+	
NL		+	+		+			++	+
UK						+	+	+	
DE	++	++		+		+	+	+	

Source: Cevifop 2012: 61. Legend: dark cells indicate reported skill shortages

Second, current and future **skill shortages may importantly interact with the age structure of the workforce**. Based on representative eco-industry sectors such as water supply, sewerage and waste management, figure 4 in annex shows that

¹³ Ecorys (2012), pp. 36; GHK, Warwick Institute for Employment Research (2011) 'Studies on Sustainability Issues – Green Jobs; Trade and Labour', 135 ff.; ILO (2011) "Skills for Green Jobs: A Global View", pp. 75-78.

¹⁴ CEDEFOP (2012), 'Green Skills and environmental awareness in vocational education and training', Luxembourg

workforce ageing may represent a challenge especially for Denmark, Latvia, Lithuania, Slovakia and Bulgaria. Despite an overall average balance in the EU between the share of prime-age and older workers, in these countries workers aged over 50 represent 40% and over of the sectoral workforce.

The age structure of the workforce is relevant because (i) in many cases employers tend to prefer training their existing workforce instead of hiring new staff; (ii) there is an insufficient replacement of an ageing workforce by younger people, who consider low-skill green occupations of poor quality. Therefore, **facilitating the entry of young workers in these sectors requires educational and training systems to provide more targeted matching** between skill formation and employers' needs.

Third, **investing in the quality of green jobs** may enhance the attractiveness especially of lower-skilled occupations, contribute to preventing the emergence of skill shortages, as well as ensure the social inclusiveness of green growth. Various studies emphasise that the development of green sectors is associated with the risk of 'polarisation' of employment opportunities in favour of high-skilled individuals¹⁵. This is because new green technologies generate increasing labour demand for high-skill occupations such as engineering and technical expertise, management and organisational skills, as well as auditing and consulting ones. In turn, skills adaptation is likely to impact especially on low- and middle-skill occupations

Table 2 provides a telling example referred to the skills structure of green industries in Germany. Demand for low or intermediate skills is higher in the recycling industry (e.g. waste collection and treatment), and renewable energy (e.g. installations, repairing and maintenance), but also in the constructions sector (e.g. linked to energy-efficient buildings) not indicated on the table.

Table 2. Structure of Green Industries by qualification in Germany (%)

<i>Industry</i>	Low-Skilled	Skilled worker (apprenticeship)	Master craftsperson/ technician	University of Applied Science	University
Air polluting control	3.5	20.7	12.3	22.3	41.2
Recycling	16	47.4	11.4	10.2	15
Sewage	4.4	24.9	14.8	23.1	32.8
Control systems and metrology	3.4	24.4	14.1	18.6	39.5
Noise control	3.8	25.8	12.3	20.0	38.2
Renewable Energies	5.0	41.0	8.0	27.0	19.0

Source: ILO 2012

¹⁵ ILO (2011), op. cit., p. 101; GHK/Warwick (2011), op.cit., p. 145.;

b. Supporting the "Greening" of Jobs in Traditional Industries

The EU2020 climate and energy targets will orient important structural change for emission- and resource-intensive industries. Given strong competition faced by these industries in a rapidly globalising market, early innovative responses can create a competitive edge for European companies without impinging on the supply of energy at affordable and competitive prices, avoid the risk of carbon leakage, and thereby promote the creation of new domestic jobs.

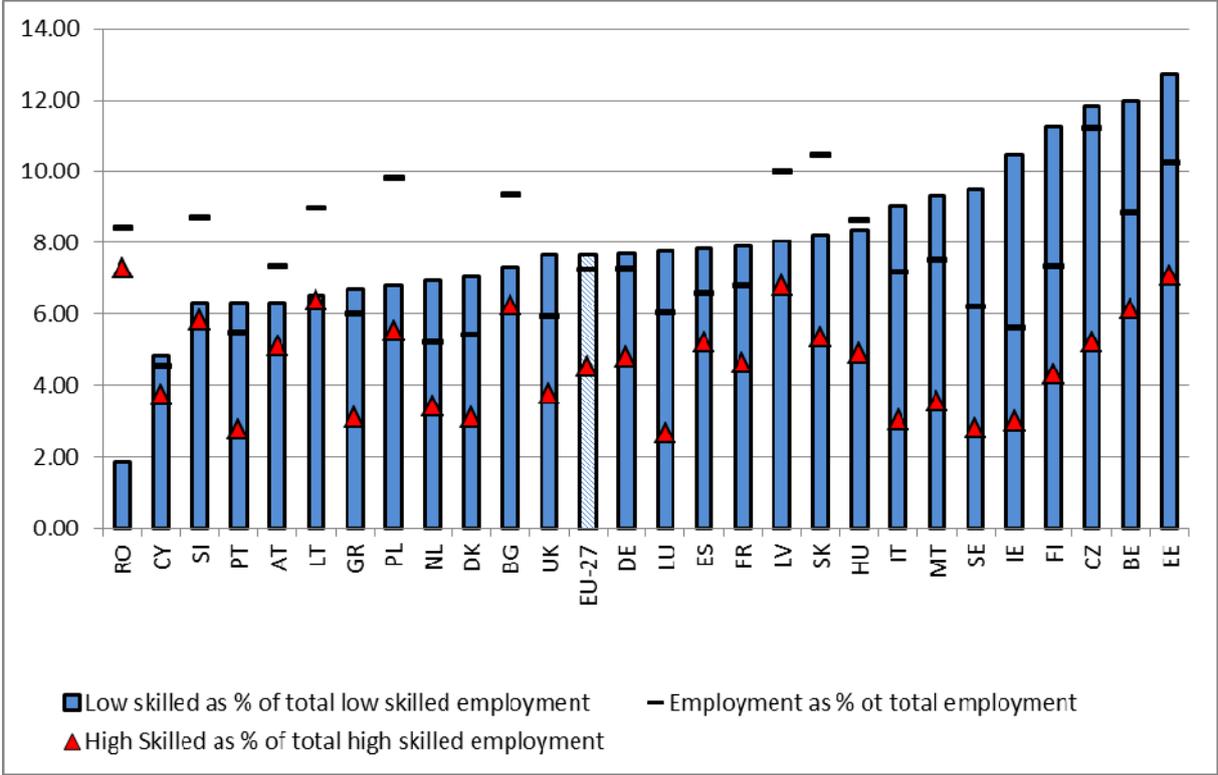
However, changes in production processes and products **implies the need for adaptation of the labour force**, including workers' retraining and displacement challenges, as well as physical investments. The provision of skill-specific training does not only support workers' employability but may also contribute to improve innovation within companies and in turn fuel new investments in the greening of sectors, for example in the building one.

Policies aimed at **retraining workers may increasingly need to focus especially on low-skilled workers**. This is because low skilled workers in traditional emission-intensive industries represent an important share of the total low-skilled workforce. Figure 5 shows that notably in Estonia, Belgium, Czech Republic, Finland, and Ireland low-skilled workers make up over 10% of the total.¹⁶ Inland transportation and the heavy industry sectors (e.g. mining) are characterised by relatively higher shares of low-skilled workers, whereas energy sectors, air transportations, and chemicals tend to employ a higher-skilled workforce.

Moreover, **retraining policies in traditional industries may require a special attention dedicated to older incumbent workers**, also in order to prevent skill shortages under changing production processes. As figure 6 in annex shows, workers aged over 50 make up 29.1% of the total workforce in traditional industries against an average of 27.6% in the economy as a whole in 2011. Important variation is registered across the Member States. Estonia, Denmark, Latvia and Lithuania record especially higher shares of older workers in traditional industries (over 35%), but ageing may become a challenge also in other countries such as Sweden, Czech Republic, Portugal, Germany, Finland and the UK. The ageing of the workforce may become particularly problematic in the land transport sector (older workers represent 31.9% of total employment) with reported higher peaks among railways employees, as well as in the electricity, gas and water supply sector (32.8%).

¹⁶ See also OECD (2012), pp. 49-51.

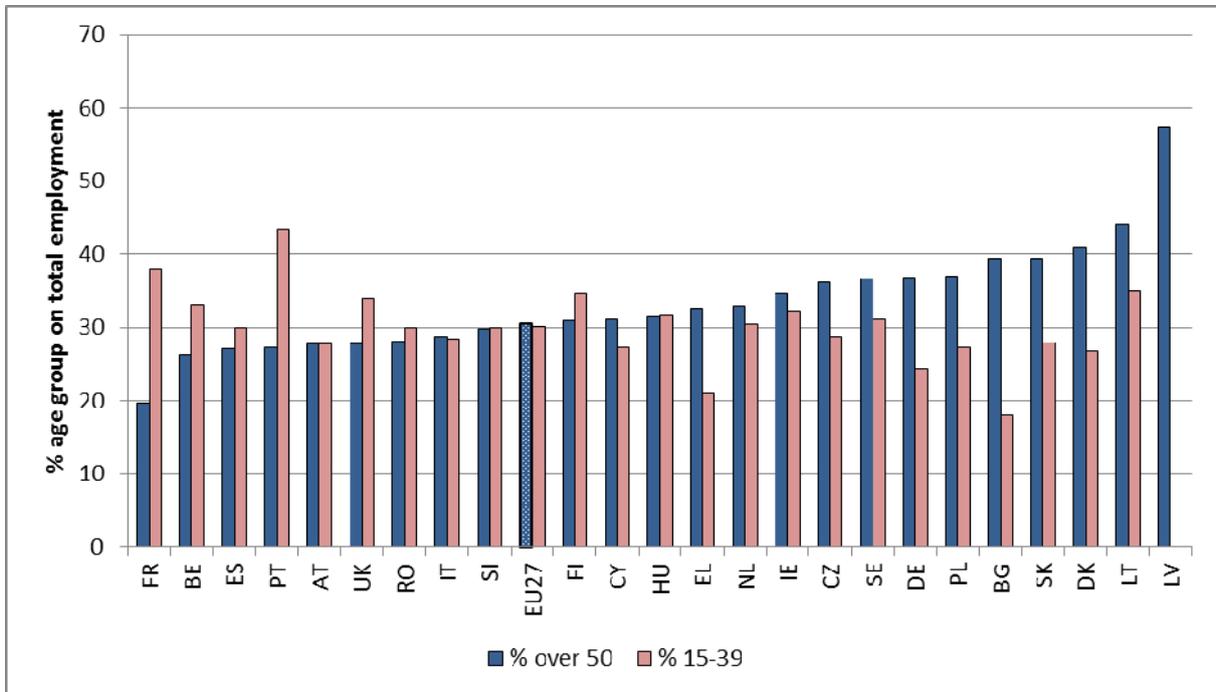
Figure 5. Emission-intensive industries in the EU, share of low- and high-skilled workers on total employment (2011).



Source: Eurostat, own calculations.

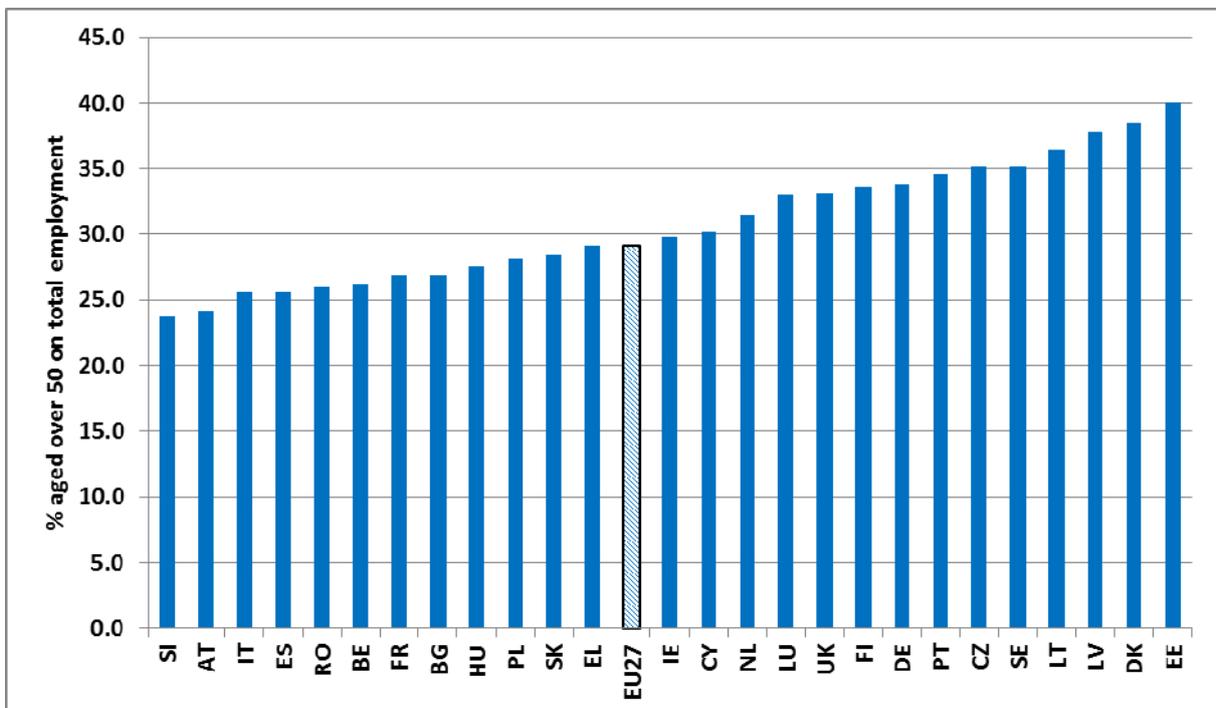
Annex

Figure 4. % share of workers aged 15-39, and aged over 50 in "Water supply; sewerage; waste management and remediation activities", 2011.



Source: Eurostat LFS – own calculations.

Figure 6. % share of older workers in traditional industries, 2011



Source: Eurostat, LFS – own calculations