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Greening of the building sector is held back by skill shortages. Skills-led strategies can drive green building forward

1. Why green building is important

The transition to “green building” is an important component of the wider transition to a low carbon economy.

Buildings are responsible for a significant share of energy-related carbon emissions, accounting for 8.1 Gigatonnes (Gt) of the current total of 29.0 Gt (IEA, 2007). To tackle climate change and reduce emissions – say to the 14 Gt level for the year 2050 in the International Energy Agency’s Blue Map scenario (2010) – requires the radical ‘greening’ of buildings globally. It requires green construction methods to be used for new buildings. Because many existing buildings will remain in use, it also requires retrofitting existing buildings with energy efficient and renewable energy technologies.

Benefits of green building

The development of green building has the potential to deliver many other benefits, beyond that of carbon emission reduction.

It brings other environmental benefits, including water conservation and the use of materials with low environmental impact.

In many cases, green building improves the comfort of the occupants of buildings, for example by supplying hot water which would otherwise not be available, by reducing the cost of maintaining a comfortable temperature, and by improving sanitation arrangements.

It provides opportunities for enterprise, not only for construction firms but also for businesses offering the technologies, materials and services required. Investment in green building offers considerable scope for generating employment opportunities, a key public policy concern in many countries. Employment in the construction sector has suffered badly during the economic crisis. Many workers now unemployed possess construction skills relevant to green building, but need retraining and upskilling.

The development of green building offers some elements of reassurance against the growing

Green building reduces energy and water usage in buildings, and reduces the environmental impact of the building process, sourcing and manufacture of building materials and components, and of demolition, reuse and recycling processes. Green building also improves health and comfort of the occupants once the building is built.



About this research brief

This research brief is a digest of the study *Skills and Occupational Needs in Green Building* (ILO, 2011), which resulted from a joint EC-ILO project on *Knowledge sharing in early identification of skill needs*. The project covered over 30 countries worldwide – both developed and developing. It was supported by the EU Programme for Employment and Social Solidarity – PROGRESS (2007-2013) and implemented in the framework of the Green Jobs Initiative – a partnership between the ILO, UNEP, IOE and ITUC. The study draws on a number of country case studies and a survey of ILO constituents including governments, employers’ and workers’ organisations. The findings were validated through a focus group discussion and an experts workshop.

global concern about energy security and energy price volatility. It links too with the growing awareness about environmental issues among individual consumers.

Barriers to the development of green building

On the other hand, there are some barriers which are holding back the development of green building. One is that the associated up-front costs may discourage investment, particularly where the benefits are long-term or are externalised beyond the individual or organisation making the investment. Countries which offer their citizens subsidies on energy costs may also be inadvertently discouraging moves to greener building methods (Saunders and Schneider, 2000). Multi-dwelling homes (where collective decision making is necessary) pose a particular challenge to green building refurbishment (Golove and Eto, 1996).

There are also information asymmetries. Many consumers think that sustainable buildings are more expensive, and in some cases not as attractive, as traditional ones. A knowledge of green building makes it more likely that a householder will consider retrofitting, or that a tenant will encourage their landlord to retrofit or even undertake basic work themselves. They may also be more confident in buying a new home built to a higher standard of sustainability.

Finally, deficiencies in the supply of skills and training for green building can function as an important barrier to progress. This is the central theme of this report.

Raising the sustainability of all buildings

The great challenge in green building is not to produce a minority of highly sustainable buildings, so much as to raise the sustainability of the entire stock of buildings in active use.

In developed countries, only a very small addition is made to the stock of dwellings each year. In the UK, for example, at least 80 per cent of the homes that will be standing in 2050 have already been built (UK Green Building Council, 2008).

Whilst showcase initiatives such as Passivhaus (Germany), Minergie (Switzerland) and the Zero Carbon Hub (UK) are important exemplars of very high standards of green building construction, green refurbishment of conventional housing stock is key to progress. This can be a challenge: left to householders and small landlords to take individual decisions (even if they are helped by generous subsidies or tax breaks), the evidence is that progress is slow.

Non-domestic buildings make up around a third of the total building stock and vary greatly in terms of energy consumption and environmental impact. Recent green building certification schemes in several countries offer ways of grading buildings according to their degree of greenness, and are useful for auditors and architects.

The focus of this research brief is not only on the relatively small part of the building sector specialising in the delivery of avowedly green buildings but also on the wider building sector, and on the skills needed to promote green building techniques throughout the industry. Furthermore, as many of the necessary skills are located outside the building construction sector, the research has also explored the wider value chain of which direct construction activities form just a part.

2. Where the jobs are – and where the jobs will be

The building sector, as narrowly defined, forms only part of the value chain that produces and improves buildings. Other key parts of the value chain include those businesses engaged in the production and distribution of building products and materials, those delivering professional services such as architecture and engineering consultancy, and finally the clients, who include property developers as well as business and individual end-users (Figure 1).

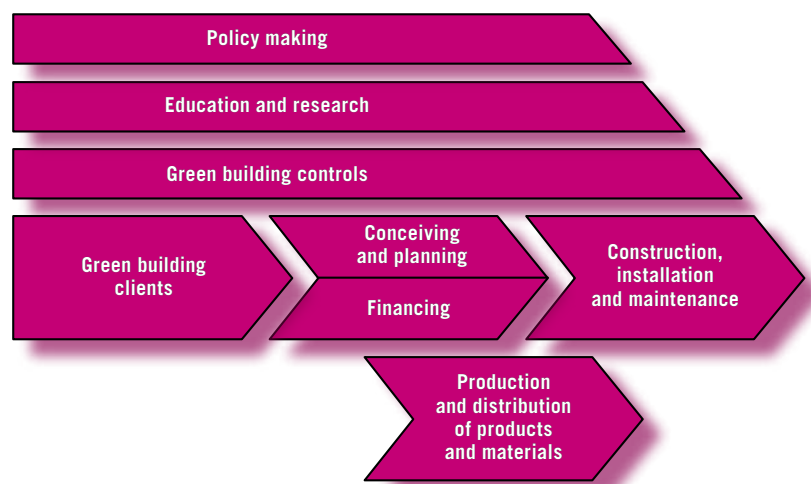
In green building a number of further additional elements in the value chain come to

the fore. These include organizations responsible for control and assurance functions, for financing green building projects, for research, for education, and for policymaking.

In relation to occupations, the core occupations conveniently fall into six clusters, relating directly to the green building value chain:

- Conceiving, planning, designing and advising occupations
- Construction, installation, maintenance occupations
- Controlling occupations

Figure 1. Green building value chain



- Enabling occupations
- Manufacturing and distribution occupations
- Green building clients

Using this as a framework, the table 1 identifies the core occupations in green building.

It is worth looking at some of these occupations in a little more detail. Country level research suggests that architecture is a key occupation in developing green business, and one where it can be difficult to find people with the right skills. For architects, as for engineers and consultants, technical skills (such as an understanding of passive design techniques and renewable energy technologies) are very important, but so too are softer skills, such as environmental awareness and an ability to communicate. Some skills needs are country-specific: research from India, for example, favours passive building techniques that draw on traditional architectural traditions. Skills in designing and conceiving new green buildings are likely to be appropriate particularly in emerging economies; for developed countries, the greater emphasis is likely to be on retrofitting.

There are business opportunities for green building. To benefit from these, construction company managers will need skills such as leadership, innovation and risk management.

The new occupation of energy efficiency analyst is emerging in many countries. Analysts require an understanding of heating, ventilation and air conditioning systems, solar thermal and photovoltaic technologies, and the energy efficiency characteristics of materials.

Green building brings new construction techniques, and although most roles can still be filled by skilled workers from existing

occupations many workers require an upgrade in their skills. Electricians, for example, are likely to need to be able to install and wire in photovoltaic solar panels. The impact on skills needs can be quantitative as well as qualitative: for example, an expansion of retrofitting will not necessarily require many new skills from trained carpenters, but it may well require an increase in the *total number* of trained carpenters.

The control aspects of green building are important to ensuring that householders, businesses, governments and others affected can be confident that the work being undertaken is to an appropriately high standard, and will deliver promised benefits. Among other newly emerging occupations is that of energy auditing, often attracting people who have moved from established occupations at professional and skilled levels (Strietska-Ilina et al. 2011).

Occupations grouped together described above as 'enabling' play a pivotal role in driving the green building sector forward. Adoption of green building on a large scale is influenced strongly by public policy, and policy makers need a strong understanding of environmental, social, behavioural and economic issues to be able to design effective policies. Urban planners need knowledge of new building codes and regulations. Soft skills such as environmental awareness, innovation and leadership are crucial for these professional occupational groups too.

Knowledge on the part of clients is also very important in ensuring the uptake of green building projects, since a lack of understanding here was identified as a major barrier to the present development of the sector. Initiatives which sensitise developers to green building issues help encourage better briefs to architects

Table 1. Core occupations in green building

Conceiving, planning, designing and advising	Construction Company Managers and Business Functions Architects and Civil/Structural/ Environmental Engineers Architectural Technicians / Technical Drawing Specialists HVAC, Electrical, Mechanical, Sanitary, RE & Building Services Engineers / Designers Surveyors Energy and Water Efficiency and Waste Management Analysts, Consultants and Advisors		
Construction, installation and maintenance	Building Site Supervisors, Site Engineers and Site Architects		
	Conservation	Insulation / Weatherization	Bricklayers; Carpenters; Plasterers; Glaziers; Masons; Roofers; Plasterers; Painters/Decorators, as well as semiskilled occupations that assist
		Efficient Heating & Cooling	Plumbers and Heating Installers / Maintainers HVAC Installers Electricians and IT Technicians
		Conservation of Electric Power (other than electric heating & cooling)	Electricians and Installers of Energy Management Systems (at domestic level, mostly responsibility of individual householders to choose energy efficient appliances and lighting technologies)
		Water Conservation	Plumbers
	Building Level Renewable Energy (and High Efficiency Energy) Systems	Heating / Cooling	Installers / Maintainers of Solar Thermal Systems Installers / Maintainers of Wood Pellet and other Biomass Heating Systems Installers / Maintainers of Mass Heating (Large Building or District) and Combined Heat and Power (CHP) Systems Heat Pump Installers / Maintainers
	Electricity	Installers / Maintainers of Solar PV Installers / Maintainers of Small Scale Wind Energy Systems	
Controlling	Energy Auditors Inspectors, Certifiers and Quality Controllers		
Enabling	Policy Makers Urban Planners Financing Educators and Information Providers Researchers		
Manufacturing and distribution	Manufacturers and Distributors of Green Building Materials and Products IT & System Technicians		
Green building clients	Developers Energy Managers, Facilities Managers and Building Managers Public Servants Working in Procurement and Management of Buildings Householders and Tenants		

and engineers. Householders too need a better understanding of the environmental, social and economic benefits of green building.

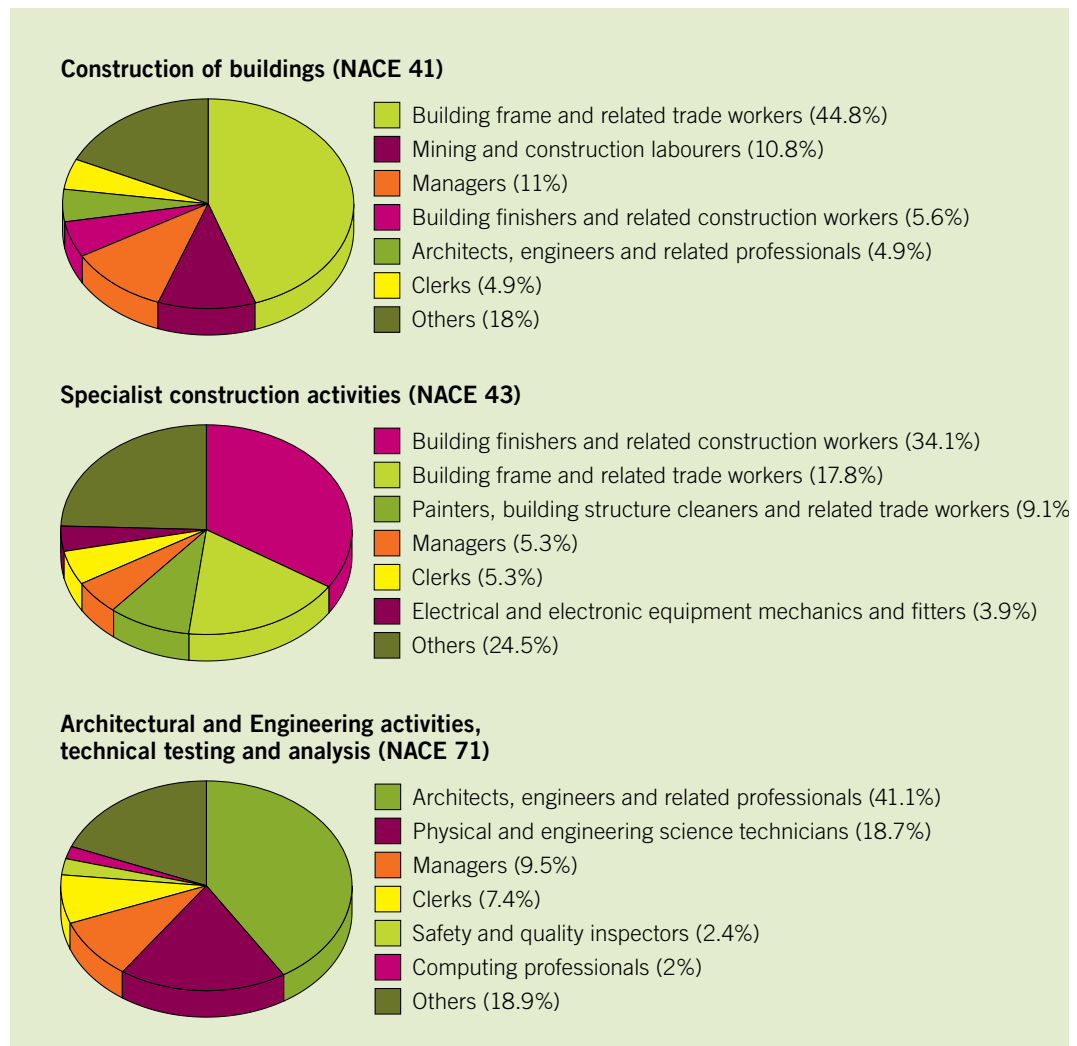
Examples of recent initiatives:

- In Malaysia, the private sector has developed the Green Building Index (GBI) as a benchmark standard for energy efficiency and other sustainability criteria, tailored for the Malaysian tropical climate and socio-economic context. A new occupation, that of the GBI Facilitator, has been created (Ofori et al., 2010).
- Separate new trades are emerging, as for example in Slovenia and Japan where specialist heat pump installers/maintainers are becoming established.

building workforce training and qualification estimated that over 2.5 million workers across EU-25¹ require training between 2006 and 2015 (Williams et al. 2010). But green building is moving to the mainstream. It may be argued, from this perspective, that the skills of all those working in the area will have to undergo a transition, whether minor or substantial. It will therefore affect a much greater number of workers: in the EU-25, for instance, about 16.7 million workers in related occupations are estimated to be affected. Eurostat statistical database provides an indication on occupational composition of related sectors (NACE 41, 43 and 71) and volumes of workforce involved in them (see figures 2 and 3)². The sector is largely dominated by men with a somewhat higher share of female workers in architectural and engineering activities, technical testing and analysis (NACE 71).

It is estimated that a large number of workers will be affected by the changes in skills demand. For instance, a European initiative on green

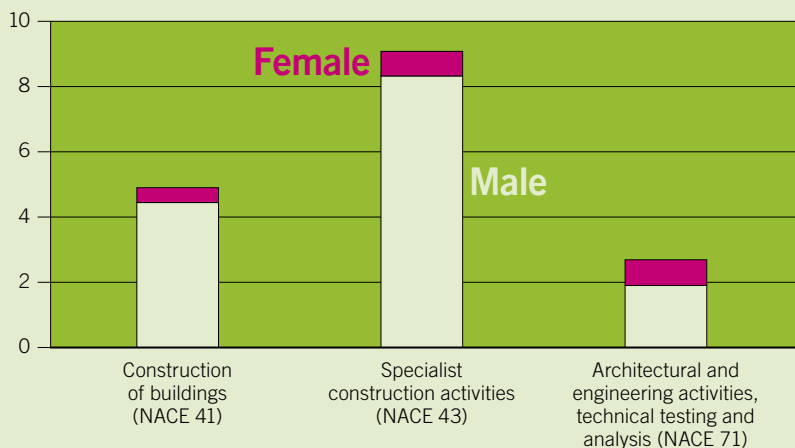
Figure 2. Most important occupations in sectors most associated with green building in EU 25



1. Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

2. Analysis of extraction from Labour Force Survey data provided by Eurostat. NACE classifies economic activities in Europe. Not all of NACE 43 or NACE 71 is concerned with buildings.

Figure 3. Occupational employment in three sectors most associated with green building (EU 25) (in Mio)



Making green building jobs decent jobs

Unfortunately, jobs in green building are not automatically decent. Building is a relatively dangerous industry, and most countries place a heavy emphasis on training for health and safety. However, even where health and safety training is obligatory, green building can expose workers to unfamiliar hazards. One concern is when workers move from large well supervised sites to retrofitting work in individual residential properties.

Examples of hazards include the risk of falls for installers of solar photovoltaic or water heating panels on roofs or those working at height to add insulation to buildings. Fixing insulation to walls and rafters where electric cables are present may lead to risk of electrocution.

Two groups of workers in construction are particularly vulnerable. The first group comprises low-skilled workers. Low skills impact on the productivity and quality of work, as well as on the wages which workers can attract. Many developing economies have a large informal building sector that does not engage systematically in formal training and which uses low-skilled workers. Migrant construction workers are another vulnerable group, both in many developing countries and in some developed countries.

Initiatives to promote green building should seek to ensure that the work created is decent work. Provision of training and skills upgrading among other things can contribute to the improvement of working conditions. Governments and social partners should take a tripartite approach to



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considering how any skills deficiencies in their construction labour force can best be addressed. Evidence suggests that on-site training, whether provided by training institutions, employers or workers' organisations, is best for those on substantial building sites. Those working on smaller projects will require training from training institutions or workers' organisations at times and places that suit their circumstances.

3. Identifying skills gaps and labour shortages

Although training in green building skills has increased over recent years, employers still face difficulties in finding qualified people to undertake certain jobs.

In the case of green building, the main reason for labour shortages is that skill requirements change as green building technologies and practices are introduced or changed, so that previously satisfactory skills sets are no longer adequate. Labour shortages can also come about because there are not enough people interested in working in an area, or because there are deficiencies in training which make it difficult for those who are interested to attain the necessary skills.

In most countries, there are enough people interested in working in the building sector. Skills gaps therefore are mainly a consequence of the rapid greening of building activity and of advances in techniques and technologies which change skill requirements faster than education and training systems can respond. There is a strong argument that skills-led strategies which are based on developing skills and capabilities *ahead* of current practice can make a very strong contribution to the policy objective of driving green building forward.

Anticipating the skills needs for green building

A wide range of agencies and organisations, including the social partners, have an active interest in identifying and helping develop green building skills.

While policy makers and researchers in many countries have undertaken analyses of the skills requirements associated with green building, relatively few have studied the requirements quantitatively. Quantitative assessment needs to minimize uncertainties that affect accuracy of results including future policy, volume and composition of retrofitting and new green building, energy prices. Proposed targets for upgrading buildings and the ensuing skills implications are a possibility, as are different future scenarios.

Examples of recent initiatives:

- The Central European University in Hungary undertook a detailed and rigorous national level study on the employment impacts of retrofitting setting out five scenarios and using case studies and macroeconomic modelling (Ürge-Vorsatz et al., 2010).
- In the US, researchers assessed the employment impact of green elements of the US stimulus package which has supported “weatherization” work and other green activities (Heintz et al., 2011).
- The European Trade Union confederation has studied the impacts of climate change on employment in the European Union including in the construction sector presenting four different scenarios (ETUC et al., 2007)

Core skills for green buildings

As well as the particular skills needed for the specific occupations and occupational clusters illustrated above, there is a set of core skills which are needed by those working in all areas of green building.

Given the rapidity of change, there is a requirement for *adaptability to change*. There is a need for adequate *environmental awareness*. Green building also calls for *interdisciplinary* skills, including the ability to work effectively with people from other disciplines as well as individually having skill sets which cross traditional occupational boundaries. Finally, *teamworking, coordination and leadership* skills are important core skills in all areas of green building.

A specific issue in developed countries, where retrofitting work is more important than new buildings, is that in many cases construction workers are moving from large building sites to undertake retrofitting work in people’s homes, where acceptable behaviour may be quite different and where improved communication skills will be needed to work with clients. There is a need for training to prepare construction workers to work in this very different environment.

Table 2. Main skills responses in green building

CLUSTERS OF OCCUPATIONS	MAIN SKILLS RESPONSES
Conceiving, planning, designing and advising	University degrees Specialised masters and other forms of continuing training in energy efficiency, building codes and energy certification Training offered by professional associations Continuing professional development Professional CPD requirements In-company training Certification institutions
Construction, installation and maintenance	Adaptation of technical and vocational education and training (TVET) courses / new TVET courses Formal apprenticeship system Continuing training offered by industry associations and workers' organizations In-company training Active labour market policy measures for unemployed Entry-level training by non-for-profit organizations
Controlling	University courses (degrees and continuing training) Technical education complemented by certified working experience Training and examination related to certification
Enabling occupations	Training for teachers Higher education for urban planners Training for policy makers and finance professionals
Manufacturing and distribution	Same experiences as in manufacturing for other sectors
Green building clients	Courses in green procurement Information campaigns Higher education in energy management

4. Actions to avoid labour shortages

Many governments are establishing policies and offering financial incentives to move green building forward. However, in many cases these initiatives lack a training component. Lack of skills is a bottleneck which needs to be addressed.

Appropriate ways of developing training and education for green building depend on the particular occupations being targeted. Table 2 highlights the main skills responses for the six occupational clusters identified for green building.

Encouraging good practice

Universities are gradually adapting their curricula to meet the increasing demand for professionals in green building. There is a developing, but increasingly wide, range of specialised masters and postgraduate training programmes.

Examples of recent initiatives:

- In Latvia, Riga Technical University has integrated principles of green building into basic courses for architects and engineers.
- In Denmark, Bachelor degree students in Architectural Technology and Construction Management can specialise in Energy Efficient Sustainable Design and Construction (ESDC).
- 18 universities in China have initiated the Green Campus Programme in collaboration with the China Green Building Council to promote the concept of green building on campuses, establish standards and organize training and knowledge exchange.
- In Brazil, town planners as well as architects and engineers can undertake a post-graduate course in Planning and Management of Sustainable Buildings.
- In India, training for urban planners in sustainability issues is increasingly available at Masters and PhD levels.
- A useful review of university architecture courses in European and extra-European countries was undertaken in 2010 with support from Intelligent Energy Europe (EDUCATE, 2010).

Professional associations are important training providers, through conferences, seminars and short training courses. Some professions in particular countries have compulsory continuing professional development requirements, and these are increasingly covering green building issues.

Examples of recent initiatives

- The Philippines Green Building Council trains professionals in a green building rating system.
- The Latvian Association of Architects started its Energy-saving building in Latvia project in 2010. It aims among other things to provide training for professionals.
- The Colegio Oficial de Ingenieros Industriales de Madrid (Association of Industrial Engineers of Madrid) provides training to its members on energy certification.

The content of many TVET courses has been modified to introduce green building content. Developed countries in particular have introduced new modules (covering topics such as energy certification, solar thermal installation and sustainable materials), and updated training for trades such as plumbers and electricians. High demand in some countries has led to the creation of new training programmes specifically on green building. There are also some innovative developments of formal apprenticeship schemes.

E-learning techniques are being employed, as for example with the Tool Energie BAT web-based initiative on energy-efficient refurbishment of buildings in France³.

Examples of recent initiatives:

- In Spain, the curriculum for a new advanced technical degree in energy efficiency and solar thermal energy was developed in 2010.
- The Australian apprenticeships program targets insulation apprenticeships, looking to turn short-term insulation jobs into long-term careers.
- FEEBat (Formation aux Economies d'Energie des entreprises et artisans du Bâtiment) is a partnership between French public organisations, professional associations, SMEs and energy companies, which aims to train 120,000 people by 2020, mainly in retrofitting*.
- The BCA Academy in Singapore offers, among other training courses, one in passive building designs for natural ventilation**.

* www.feebat.org

** BCA Academy course list available here: http://www.bca.gov.sg/academy/courses_tests.aspx

In refocusing the building sector towards greater sustainability, the role of public employment services and other governmental institutions is important. They play a role in retraining unemployed workers and those from other disadvantaged groups. One example is an initiative in the Spanish region of the Balearic Islands, where unemployed workers are offered the chance to train as installers of renewable energy technologies in buildings, or as green building technicians.

Governments and public bodies also have an important role to play in information campaigns about green building, targeted at home-owners and end clients as well as at the construction industry and aiming to overcome the lack of understanding of green building issues among society in general

Examples of recent initiatives:

- In Germany, private householders can access energy calculation tools on-line.
- Belgium has created provincial advisory centres for sustainable living and building. These organise campaigns, offer training and give advice.

and potential clients in particular.

It is also important that trainers are themselves trained in understanding green building issues. One proposal in France aims to offer TVET lecturers a dedicated postgraduate course on green building. In Navarra (Spain), teachers are able to access courses put on by FFER-CENIFER, the Foundation for Training in Renewable Energies.

The role of the social partners

Tripartite education and training structures provide an institutional way to involve industry and workers' organisations in decision-making

Examples of recent initiatives:

- In Belgium, the Alliance Employment-Environment for the building sector has a training working party composed of regional and local government representatives, business associations and trade unions, as well as researchers, education and training providers and civil society organisations.
- The New York City Green-Collar Jobs Roundtable is a campaign of training organizations, businesses, labour unions and community-based programs, aimed at incorporating specific training on green techniques into their programmes.

3. www.energiebat.fr

about training delivery. In Germany, for example, green building concepts are being introduced in apprenticeship programmes whose content is determined in tripartite bodies. In Australia, tripartite dialogue has led to an increase in training numbers.

In many cases, employers' and workers' organizations are together working to ensure

that adequate training in green building skills is available. This is the case, for example, in Spain, where the Fundación Laboral de la Construcción (Labour Foundation for Construction) has introduced green concepts into its curricula⁴. The social partners in the construction industry have also been working around sustainability issues in Brazil.

5. The way forward

Skills development has a strategic role to play in promoting the development of green building. It is essential that there are enough workers, equipped with the right skills, to ensure that green building can develop.

Include skills development in green building initiatives

There is evidence that many worthwhile initiatives to promote the greening of buildings are being held back because of shortages of skills. It is important that future green building programmes and projects are established with strategies to address skills issues, including appropriate training components.

The importance of labour is particularly apparent in retrofitting of existing buildings, where labour costs make up a very large proportion of the total costs (often well over 50 per cent, in the case of wall insulation). In this situation, there are clear economic benefits in maximising labour productivity and eliminating the need to replace sub-standard work. Labour productivity and quality of work are both related closely to skills quality.

Consider skills-led strategies for green building policy

While most government strategies to promote green building are demand-led, focused on increasing demand for green building, there is also room for supply led approaches, focused particularly on boosting the supply of people with the skills required to deliver green building projects, both in terms of the number of people and in terms of their capabilities. People with the right skills can act as drivers of change and facilitate new investments. Initiatives by professional institutes and bodies such as Green

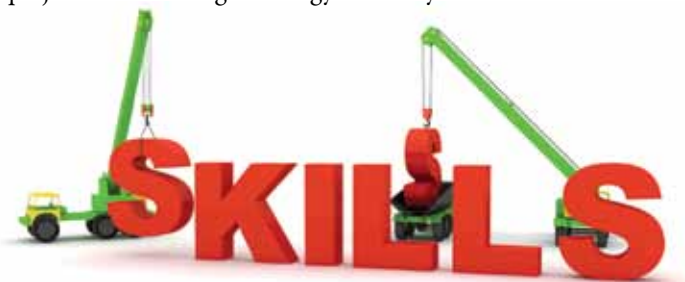
Building Councils to provide training in green building to construction professionals are an important example of such a strategy. Initiatives by several governments to provide unemployed skilled construction workers with training in green building skills in areas such as insulation and installation of solar thermal heating systems are another important example, even where the motivation is more about improving employability than driving green building forward.

Provide broad skills for manual occupations

Although there are considerable variations between countries in the way that workers are trained, some recommendations common to all can be made.

Training of skilled construction trades workers to prepare them for green building projects should be broad enough to give them a good background understanding of the subject, and not focused just on the specific areas where they will work. Initial training in installing particular types of green building technology should prepare them to work on that technology through its lifecycle, from installation through maintenance to eventual removal, disposal and recycling.

For senior workers, their training should include leadership in green building retrofit projects and advising on energy efficiency.



4. FLC membership: Confederación Nacional de la Construcción (CNC), Federación Estatal de Construcción, Madera y Afines de CC.OO. (Fecoma-CC.OO.) and Metal, Construcción y Afines de UGT (MCA-UGT).



Look at skills beyond the building sector

Developing skills in green building issues and techniques is not confined to workers in the traditional construction industries. As mentioned earlier, a wide range of other occupational groups are affected, including trainers, urban planners, and those responsible for authorising investment decisions.

Given the important driving and enabling role which is being played by public policy, it is also necessary to ensure that policy-makers are properly equipped with the skills they need. The skills of those involved in policy design in this area are likely to have a significant impact on the quality of the policy choices made.

Finally, it is vital also to focus on developing the understanding of green building among clients and potential clients. A critical issue in green building is how householders, businesses and other green building clients can get reliable advice on what green building measures they should take. This is a universal issue.

A strong supply of people with skills in energy efficiency assessment, advice, design and quality assurance across all the occupational groups involved provides the best assurance that clients will have access to reliable services at competitive prices.

Prioritise green building in the provision of construction related training and education

Providers of training and education that develop skills for construction related industries should prioritise skills for green building. Many already

do this, but it is important that it should become more universal.

The need is both in initial training and education and in continuing education and training. It is relevant to education and training organizations, and to other bodies such as professional institutes and suppliers of construction goods and services that are also important players in construction industry training.

More and better training in assessment, advice and quality assurance

There is a widespread need for more people with better skills in assessing building energy saving needs, in providing advice and in quality assuring works. This means a need for more and better training in the following areas.

- Training for substantial numbers of people with existing construction skills, leading to one or more standard qualifications in building energy assessment where this is not already in place; and
- Training in provision of advice on building energy efficiency for substantial numbers of people with construction skills at both professional and skilled levels, again leading to standard qualifications.

Engage social partners

Governments, employers' and workers' organisations have a shared interest in tackling skill gaps in the green building value chain. Although skills issues have been high on the

agenda of the construction sector in general as well as in green building in many countries, the construction sector as a whole still suffers from high degree of informality and low unionisation. A large number of temporary, casual, informal and migrant workers find it difficult to participate in the institutions or mechanisms of ongoing social dialogue, and also find themselves excluded from many training opportunities in the sector. Country experiences demonstrate that the presence of bipartite and tripartite sectoral organisations, such as the Fundación Laboral de la Construcción (Spain), help to improve the dialogue between different actors in the sector, increase the role of social partners in anticipation of skill needs and in expanding training opportunities in building in general and in green building in particular.

Boost incentives for training in green building

There is a need to ensure that those working in construction receive sufficient training to develop the green building skills that are required. Different countries have different mechanisms to promote continuing training and to motivate workers in small and medium enterprises to take it up. They should apply these mechanisms to promote the provision and uptake of continuing training courses in green building skills. Likewise, incentivising women in engaging in occupational training related to green building will not only help to break gender barriers and occupational segregation in the construction sector but also to resolve labour shortages in technical occupations.

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