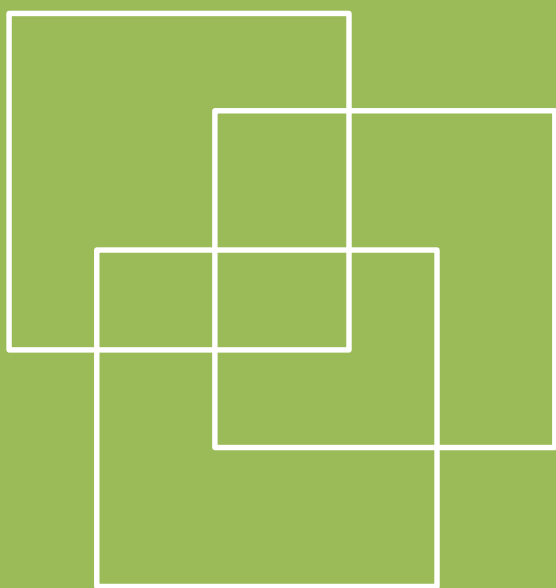




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Skills needs in emerging green jobs in the building and tourism industries in Thailand



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Alexis S. Esposto

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Preface

Thailand's Tenth National Economics and Social Development Plan (2007-11) has the goal to upgrade the country's environment management in order to protect the resource base and maintain the natural balance in the natural environment. Through His Majesty the King of Thailand, a number of green projects were implemented with the aim of transferring these projects to the people to promote the Sufficiency Economy philosophy.

In 2011, the ILO Skills and Employability Department has launched a global research project to investigate skill needs for greener economies, in cooperation with the European Centre for the Development of Vocational Training (Cedefop). Thailand is one amongst the selected 21 countries where research on skills for green jobs was conducted. The Thai Government has pledged a strong commitment to implementing green policies, however coordination in implementation is one of the challenges.

The country faces an array of environmental threats such as scarce natural resources, demolished ecology, pollution and increasing natural disasters. These environmental issues have the potential to become exacerbated in the face of the current economic climate, where resources are being diverted from environmental protection. Natural resources and the environment in Thailand have been affected by worldwide events including both climate change and domestic factors such as increasing population.

The need for retraining employees for green jobs has occurred alongside a growing awareness of environmental problems. Many multinational corporations are increasingly encouraged to implement green practices by their head offices abroad. The training for green skills in general is demand-driven and depends on the requirements of establishments, industries and companies. However, retraining people at an earlier stage is important to equip them with the relevant skills and knowledge to find work.

Thailand has no formal database providing information on green skills, green jobs and green collar occupations yet. Identification of green skills needs for the labour market is usually undertaken by employers or establishments conducting research and development for the new process, products or services. The Government identifies skill needs through proposed projects that require people to work and be trained to attain a certain quality of the work.

A significant challenge faced by the Thai economy is to understand the skills and knowledge requirements of occupations in industry resulting from the increasing demand for a green sustainable economy. The *Skills needs of emerging green jobs in the building and tourism industries in Thailand* study focuses on selected priority occupations in construction and tourism, with a particular attention in understanding the skills gaps and needs in these two industrial sectors.

The purpose of this study is to identify the skills needs and gaps in the construction and tourism industries in Thailand, with a view to transform jobs in these industries into green jobs. Current skills and training systems were reviewed and analysed to see whether the skills and competency standards had green-job components. The study reveals the limitations of skills standards in these two aforementioned sectors. The study proposes skills for green jobs responses as well as provides recommendations on the best way to integrate green skills and green job components into Thailand's skills and competency standards for selected priority occupations in construction and tourism.

Tomoko Nishimoto

Assistant Director-General and Regional Director
for Asia and the Pacific

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Executive summary

Like many developing countries, Thailand is currently coping with a host of environmental challenges and an urgent need to reduce carbon emissions. To meet these challenges, Thailand has come up with strong policies designed to enhance environmental conservation. However, without providing its labour force with suitable and up-to-date job skills, knowledge, and abilities, the challenges become difficult to overcome. A significant challenge in the Thai economy is to understand the skills and knowledge requirements for occupations in industry resulting from the increasing demand for a green sustainable economy. In view of this, this report places particular attention on understanding the skills gaps and needs in priority occupations within two sectors: construction and tourism.

The research was conducted using three major techniques. The first used desktop research, which relied on obtaining critical information from either published or non-published “secondary” sources. The second methodology consisted of interviews with key informants. These included expert officers from the ILO; expert officers from the DSD and the Ministry of Labour; and representatives from the construction and tourism industries. The final method involved analysis of skills competency standards around the world.

The report presents a rationale for the emergence of green occupations in Thailand as a response to climate change, and as a means of moving towards a low carbon economy. A mechanism for achieving this goal is to train and retrain workers with a set of well-defined, green-knowledge skills sets. These skills and knowledge sets can be developed through the promotion, advancement, and implementation of green competencies.

The report also provides a number of methodologies to help make the transition to “green occupations”. This was done by identifying groups of priority occupations in construction and tourism. By analysing the skills gaps and needs in these sectors, “green competencies” were developed to transform these priority occupations into green jobs.

One such methodology consisted of providing a framework for creating green competencies for the priority occupations in tourism and construction. The report proposes a methodology to create a database of green occupations by creating a taxonomy of potential green jobs. It also reviewed international experiences, and identified new green jobs that have emerged as a result of technological change, new environmental management processes designed to respond to climate change, and new institutional regulatory frameworks and processes.

The research revealed the limitations of skills standards in the priority occupations for Thailand. It found that “green skill” components were not explicitly stated in the skills standards, and proposed solutions to these shortcomings through a written set of job-specific “green competencies” that meet the needs of the priority occupations in construction and tourism. The study also proposed the implementation of a national green skills agreement as part of Thailand’s National Qualifications Framework (NQF). The aim of integrating the skills agreement into the NQF is to implement educational policies designed to assist Thailand in its transition to a low-carbon and sustainable economy.

About the author

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Alexis is also conducting international relations leadership research. He has been instrumental in creating a leadership matrix for trade and cultural engagement with Latin America and Central European nations. He is creating a leadership matrix for engagement between Australia and ASEAN.

Abbreviations and acronyms

ANZSCO	Australian and New Zealand Standard Classification of Occupations
ANZSIC	Australian and New Zealand Standard Industrial Classification
AQF	Australian Qualification Framework
ASEAN	Association of Southeast Asian Nations
DSD	Department of Skills Development
DVT	dual vocational training
EC	European Commission
GDP	gross domestic product
GSA	Green Skills Agreement (Australia)
HCT	hotels, catering, and tourism
ILO	International Labour Organization
ISCO-08	International Standard Classification of Occupations, 2008
NESDB	National Economic and Social Development Board
NGO	non-government organization
NQF	National Qualifications Framework
OH&S	occupational health and safety
O*NET	(US Department of Labor) Information Occupational Network
OVEC	Office of the Vocational Education Commission
TVET	technical and vocational education and training
UNWTO	United Nations World Tourism Organization
WTTC	World Travel and Tourism Council

1. Background

Nations around the world are undergoing continuous change and uncertainty, and as a result, our lives are being transformed at a very rapid pace. In fewer than 40 years we have experienced a revolution not seen before. New technologies, increasing trade between nations and across regions, changes to our institutional frameworks, and the freeing up of capital markets have transformed countries, regions, and the world of work (Pearson and Foxson, 2012; Esposto, 2008). Added to these massive changes is a deeper understanding and realization that climate change requires urgent attention and action to protect our increasingly fragile planet (IPCC, 2013, 2007; Garnaut, 2011, 2008; and Stern, 2007 amongst others). Furthermore, there is unquestionable evidence that climate change and environmental degradation present a serious risk to our livelihoods and to future generations (IPCC, 2013; 2007), and that the scientific evidence is consistently showing that global warming has arisen out of anthropogenic causes (IPCC, 2013). “It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century. The evidence for this has grown, thanks to more and better observations, an improved understanding of the climate system response and improved climate models.” (IPCC, 2013)

By analysing over 11,000 journal abstracts, Cook et al. (2013) show that in the scientific community there is an overwhelming consensus that the major cause of global warming is the result of human activity. Only a small yet vociferous minority that protects and represents certain powerful economic and political interests have put into question the enormous weight of scientific evidence, which clearly states that the world faces serious challenges as a result of global warming.

In explaining the challenges of climate change, Garnaut recalls the following discussion:

“But then I said something that brought back the prime minister’s attention. ‘If we used the share market’s discount rate to value the lives of future Australians,’ I said, ‘and if we knew that doing something would give lots of benefits now but would cause the extinction of our species in half a century, the calculations would tell us to do it.’ ‘You’ve got us there, Ross,’ she said, as the others were infected by the lift in spirits and joined the laughter. ‘That’s a unanimous decision of the committee. We’re all against the extinction of the human species’”. (Garnaut, 2011, p. ix.)

Garnaut further explains: “The costs of reducing emissions will come straightaway. The benefits of reducing damage from climate change will come later – many of them to later generations”. (Garnaut, 2011, p. ix.)

Put simply, this is another way of saying that the opportunity costs of delaying carbon emission reductions and reversing environmental degradation are extremely high to our generation and future generations.

Actions to combat climate change fall into two major groups: mitigation and adaptation. Climate change mitigation includes responses and actions currently undertaken and proposed by governments and enterprises around the world, designed to reduce greenhouse gas emissions. Such actions include the introduction of carbon taxes and the implementation of various carbon trading schemes designed to minimize greenhouse gas emissions. Adaptation, on the other hand, “... means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimize the damage they can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later”. (European Commission [EC], 2013a.)

According to the European Commission (EC), adaptation strategies are needed at all levels, including in local communities, within enterprises, and at the regional, national, and international levels. Policies of mitigation and adaptation are also required in developing countries such as Thailand, where the

impact of climate change and environmental sustainability are major challenges. Partly, these challenges have occurred as a result of Thailand's very rapid economic growth over the last few decades. Its rapid industrialization, particularly on the Eastern Seaboard, has brought with it a host of new environmental imperatives and challenges. To address these issues, Thailand, since 1996, has introduced a number of social and economic development plans. In 2011, the government, under the guidance of His Majesty King Bhumibol Adulyadej, formulated the Eleventh National Economic and Social Development Plan for the period 2012–16. Designed to address a rapidly changing environment, the plan places particular attention on the philosophy of "Sufficiency Economy" bestowed upon the Thai people by His Majesty King Bhumibol Adulyadej since 1974. The heart of this philosophy is "human development" toward well-being based on sufficiency, moderation, reasonableness, and resilience (NESDB, 2011, p. a.).

Thus, the challenge for nations such as Thailand is to find policy solutions that consist of the right mix of mitigation and adaptation policy frameworks that address climate change. "This includes recognizing that many mutually re-enforcing synergies exist between specific mitigation and adaptation solutions that can lead to more efficient allocation of 'climate response' resources" (FAO, 2012, p. 6). Thus, the Thai government believes that the sustainable management of natural resources is a central element towards achieving a reduction in carbon emissions and a clean future.

In order to maintain balances within the ecosystem, emphasis will be aimed at managing natural resources and the environment through a shift of the development paradigm and participation by local communities. Under this approach, various issues will be addressed, including creating a low-carbon society, preparing for climate change and natural disasters, and ensuring consistency between trade practices and environmental protection (NESD, 2011, p. i-j).

"Climate change and environmental degradation are jeopardizing the sustainability of many kinds of economic activity" and "... moving towards a greener economy is creating opportunities for new technologies, investment and jobs". (ILO, 2011a, p. v)

As the world steps up to tackle climate change, a series of new mechanisms and innovative idea implementations are emerging. These innovative solutions are now going beyond simply "saving" the physical environment. They are looking at improving the human capital of nations by transforming the way we do things at work. Human capital is the set of endowments or personal attributes that men and women possess in the form of abilities, knowledge, and skill, which when applied as worker activities provide a value to the economy and society. Thus, human capital is a factor of production, which when transformed to combat climate change can add considerable value to the sustainability of the environment. Hence, through investments in training and retraining, every potentially existing job could become a "green job", having a positive effect on our physical environment, and improving our welfare, not only at this point in time but for future generations. Taking this to the next level implies that potentially, every single task and work activity that we perform in our daily lives is "green" and can provide a positive return to the environment.

2. The emergence of green jobs

Adaptation and mitigation are the two current policies that have emerged to tackle climate change. Mitigation is directly concerned with the reduction of greenhouse gas emissions. Government responses include the imposition of taxes on carbon emissions, the introduction of energy trading schemes, or the imposition of regulations designed to minimize waste, pollution, and carbon emissions (IPCC, 2007). Adaptation, on the other hand refers to the "...actions by households, firms, other organisations and governments to respond to the impacts of climate change that cannot be avoided through climate change mitigation efforts". (Productivity Commission, 2012, p. v) These two types of policy responses have contributed towards the emergence of the green economy, which includes the set of economic practices "... related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy". (Dierdorff, et al., 2009 p. 3)

These policy changes have created a green revolution that has been driven by technological improvements, innovations, and social and economic imperatives. As the old economy shifts towards a greener economy and workers are required to adapt to new, greener technologies, the nature of work activities changes and shifts to meet the skills needs, demands, and requirements of new technologies and workplace innovations. This has resulted in the emergence of a new type of occupation: the "green job".

But what are green jobs, in the context of a rapidly changing economy and society? Defining a "green job" is a complex and difficult task because the concept is new and evolves rapidly, having to adapt to new and complex circumstances. As a result, definitions of "green jobs" are many and varied. An added complication is that a commonly accepted definition does not yet exist. For example, in the United States, Dierdorff et al. (2009, p. 9; 2011, p. 14-15) identify nearly 20 distinct definitions in the United States alone. According to the authors, some definitions tend to be broad both in terms of the span and detail of the definition, while other definitions take an environmental impact approach. One such example of the environmental approach provided by Dierdorff et al. (2009) is the one given by the US Department of Labor's Bureau of Labor Statistics: "A. Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources. [Or] B. Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources." (Dierdorff et al., 2011, p. 15)

The EC (2013b), for its part, classifies definitions of green jobs into two categories – one being the eco-industry approach, in which jobs are classified into the nature of the activity, and the other being the transformation approach, arguing that all jobs can become green.

The definitional approach taken by the International Labour Organization (ILO) is a more holistic one, and takes into consideration not only the industrial, economic, and environmental concerns, but also social outcomes.

" 'Green jobs' are defined as jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. This definition covers work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of the environment while also meeting the criteria for decent work – adequate wages, safe conditions, workers' rights, social dialogue and social protection. It also covers activities related to both mitigation of and adaptation to climate change. This is a working definition. It implies in its inclusivity and breadth that every job can potentially become greener. As time goes on and the transition to a green economy intensifies, what is considered a green job today might not continue to be so regarded. The understanding of green jobs also varies from one country to another. Ultimately, countries will need to compose their own national definitions and set thresholds for practices considered green or non-green". (ILO, 2011a, p. 4)

Central to this definition are the following elements: reducing consumption of energy and raw materials; limiting greenhouse gas emissions; minimizing waste and pollution; protecting and restoring ecosystems; fair work practices; and improvements to the welfare of nations. Furthermore, the ILO's 2008 report "Skills for green jobs: A global view" identified four drivers of change in skills requirements. These include: physical changes in the environment itself; environmental policy and regulation; technology and innovation; and changes in prices, markets, and consumer habits.

The interrelationship of these drivers is important to recognize because they are each mutually dependent and act as strong forces of change. These forces do not act in unison in developing and developed countries. For example, in developed countries, the major drivers of change have been caused by changes in consumer behaviour and the way in which market forces have responded and interacted. For developing countries, on the other hand, changes to the environment, regulation enforcement, and policy changes have become essential instruments for change. Thus, governance and the appropriate mix of well-informed policy responses tend to play an important role in developing countries because they generate incentives for investment, development, and knowledge and technology transfers.

The transformation of jobs goes hand in hand with improving the skills of individuals, and provides an improvement in human capital that leads directly to better productivity, employment creation, "upskilling" of the workforce, and sustainable development. For developing countries such as Thailand, the benefit of this is that it can potentially short-circuit the common

... vicious circle of low-skill, low-productivity, low-wage and poor-quality jobs (which) traps the working poor, excludes workers from productive employment and inhibits the competitiveness of enterprises. Improved quality and availability of training can stimulate a virtuous circle in which skills development fuels innovation, increased productivity and enterprise development, technological change, investment, diversification of the economy, and competitiveness – all factors that in turn sustain and accelerate the creation of more and better jobs (ILO, 2011a, p. 23).

As such, investments in the development of human capital towards the formation of "green skills" plays an important role in the development of nations. Like many developing countries, Thailand is currently coping with a host of environmental challenges and an urgent need to reduce carbon emissions. To meet these challenges, Thailand has adopted strong policies designed to enhance environmental conservation. However, without the development of its labour force and the provision of suitable and up-to-date job skills, knowledge, and abilities, the challenges become very difficult to overcome. A significant challenge faced by the Thai economy is to understand the skills and knowledge requirements for occupations in the face of an increasing demand for a green, sustainable economy. In view of this, the work that follows places particular attention on understanding the skills gaps and needs in the Thai construction and tourism sectors.

3. The tourism and construction industries in Thailand

3.1 Tourism

Tourism is an activity that is becoming more prominent around the world, and has an impact upon nations and regions that is both social and economic. Its worldwide incidence has increased considerably because of rising incomes, not just in the developed world, but in particular in developing economies, including different parts of Asia and Latin America and, to a lesser extent, some parts of Africa.

Trying to define tourism is difficult because it is composed of a cluster of industries and is made up of a variety of activities that at times are disjointed and fragmented. As a result of this, there exists a variety of definitions of tourism. The United Nations World Tourism Organization (UNWTO), defines tourism as

a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which imply tourism expenditure (UNWTO, 2005/2007).

For its part, the ILO defines tourism as “... the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes”. (ILO, 2013, p. 3)

It is important to note that in its definition, the ILO explicitly explains that the

Hotels, Catering and Tourism (HCT) sector differs from the definition of the tourism industry used by most organizations. The definition of the Hotels, Catering and Tourism (HCT) sector includes not only the services provided to travellers but also those for residents. For the ILO, the HCT sector comprises: hotels, boarding houses, motels, tourist camps and holiday centres; restaurants, bars, cafeterias, snack bars, pubs, night clubs and similar establishments; institutions that provide meals and refreshments within hospitals, factory and office canteens, schools, aircraft, and ships; travel agencies, tourist guides and tourism information offices; and conference and exhibition centres (ILO, 2013, p. 3).

Therefore, for operational and consistency purposes the occupations selected in the sample for tourism, fall under the ILO definition of tourism, and under the hotels, catering, and tourism (HCT) sector for Thailand.

Table 1. Summary statistics: Impact of travel and tourism on Thailand's economy, estimates and forecasts, 2012–23

Thailand	2012* (billions)	2012 (% of total)	2013^ Growth	2013 forecast billions	2023 (% of total)	Growth#
Direct contribution to GDP	THB825.6 \$26.5	7.3	6.2	THB 1 698.4 \$ 54.5	8.7	6.8
Total contribution to GDP	THB1 896.7 \$61.0	16.7	7.4	THB 3 833.0 \$ 123.0	19.6	6.5
Direct contribution to employment	2 020 000 (jobs)	5.2	10.1	3 465 000 (jobs).0	8.1	4.5
Total contribution to employment	4 819 000 (jobs)	12.4	9.4	7 528 000 (jobs)	17.5	3.6
Visitor exports	THB1 022.4 \$32.08	12.1	5.7	THB2 336.7 \$75.0	11.1	8.0
Domestic spending	THB480.4 \$15.4	4.2	6.9	THB823.1 \$26.4	4.2	4.8
Leisure spending	THB1 189.3 \$38.2	5.7	5.9	THB2 525.3 \$81.0	6.9	7.2
Business spending	THB313.5 \$10.1	1.5	6.9	THB634.5 \$20.4	1.7	6.6
Capital investment	THB227.5 \$7.3	6.8	15.9	THB572.2 \$18.4	9.8	8.1

Source: WTTC, 2013, p. 11. * 2012 constant prices and exchange rates; ^ real growth adjusted for inflation (%); # 2013–2023 annualized real growth adjusted for inflation (%); ** 000 jobs.

Table 1 shows a set of summary statistical estimates and forecasts for the Thai economy, detailing the impact of travel and tourism. The data were obtained from the World Travel and Tourism Council (WTTC). As illustrated, the direct contribution to GDP and the total contribution to GDP by travel and tourism, are quite substantial for the Thai economy. Its direct contribution to GDP is expected to grow by 6.8 per cent per year to US\$54.5 billion (8.7 per cent of GDP) by 2023, while its total contribution to GDP is expected to grow to US\$123.0 billion. Of significant import is the growth in employment. By 2023 the total contribution to employment will be just over 7.5 million jobs. This shows that the effect of employment growth will have significant implications in terms of training and retraining in the travel and tourism industry. Thus, early intervention in “upskilling” and transitioning the workforce into green jobs will be of great importance not only to the travel and tourism industry in Thailand, but also to the Association of Southeast Asian Nations (ASEAN).

Box 1
Case study
Every job can be a green job at the Dusit Thani

Ms Renu Sridee is a popular employee at Bangkok's famous Dusit Thani Hotel. She is from Suphan Buri, a central province of Thailand. She moved to Bangkok to work in the hotel industry. She recalls: "My grandmother used to tell me that the Dusit Thani Hotel was the tallest building in all of Thailand, so when I moved to Bangkok to study hospitality, I had as my goal to work close to heaven." Translated into Thai, the Hotel's name means "a town in heaven".

The luxury hotel is situated on Rama IV Road. Built in 1973, it is recognized as a social and business landmark for local and international business people in Bangkok.

"Our hotel was one of the first to gain recognition in service excellence" explains Siradej Donovanik, Assistant Director of Project Investment. The hotel operates under the Dusit International chain of hotels and resorts. The company began its operations 60 years ago, with its first hotel, the Princess, on Bangkok's New Road.

The company has since expanded to become one of the major players in the hotel industry in Asia. The company's hotels can be found in most of the major capital cities of Asia. Its presence is strongly felt in China, India, Singapore, and the Philippines. In the last two years, it has established hotels in Dubai, Abu Dhabi, and Cairo. Its expansion is continuing and it will set up operations in the United States and Nairobi. It also owns world-class resorts in the Maldives and the south of Thailand.

"Our vision," explained Mr Donovanik, "is to deliver an exceptional hospitality experience that reflects the unique artistry and culture of Thailand. As a hotel, we must deliver standards of perfection, innovation, and excellence." Mr Donovanik is a young and very proactive business leader who explains that "excellence, perfection, and innovation to us means to begin to look after the environment".

An example of a green initiative at the Bangkok hotel has been to establish a water processing and bottling plant. "By doing this, we become less reliant on plastic, and it reduces waste. It also helps financially, and positions us in the marketplace. Not only that, our customers are demanding very clearly that they want green services," explains Mr Donovanik.

To do so, the Dusit Thani has implemented various policies to promote environmental sustainability. These include the use of green detergents that do not damage the environment. To ensure that the least damaging products are used, employees such as Ms Sridee are consulted. "Their direct experience is very important to us," explains Mr Donovanik. "When we purchase sustainable products, we not only consult the experts, but we also seek advice from our frontline workers, people like the maids, the cleaners, the cooks, and others, the end users of the products."

The Dusit Thani Bangkok is in the process of becoming more proactive towards saving the environment. Among its environmentally safe practices, the hotel ensures that employees like Ms Sridee are heard "We have monthly meetings that are organized by our Earth Check Team. The team collects information from our staff, and uses the knowledge and expertise obtained to formulate green company policies".

From these meetings a policy of waste disposal was formulated that contains five kinds of rubbish disposal methods, which include paper, plastic bottles, cans, glass bottles, and hazardous waste. "We were thinking of three types of rubbish disposal methods at one stage, but in the end, Ms Sridee convinced us that by having five, we could make the environment a lot cleaner," explains Mr Donovanik.

3.2 The construction industry in Thailand

The construction industry is concerned with work on new or existing commercial, industrial, or domestic buildings or structures, as well as national infrastructure, which may include railways, roads, dams, water and sewage infrastructure, and mining. It operates in the government and the private sector (ABS, 2010, p. 3) and is undergoing a major transformation as lifestyles change, and government institutions, industries, and the younger generations of Thai people demand more sophisticated homes, commercial and business buildings, and high-quality infrastructure. These transformations have been the result of solid and continuous trends in economic growth that date back to the 1990s.

From 2002–2007, Thailand's growth averaged at around 5 per cent. Thailand's economic growth slowed because of global economic conditions and political uncertainty in 2009 and again, in 2011, from the devastating floods. However, Thailand's economic activity is gradually returning to normal, with quarterly economic growth rates now closer to the levels often seen before the global financial crisis began in 2008. The GDP rebounded from the floods at 6.4 per cent in 2012 and is forecasted to continue growing at 5.0 per cent in 2013 (World Bank, 2013).

A main hurdle and possible future challenge for Thailand and countries in the ASEAN region is continuing uncertainty in world markets, particularly related to the persistent euro-zone crisis and current political instability in the US. The current gridlock, emanating from its political fiscal deadlock, has the potential of “needlessly putting at risk the stability and growth not only of the U.S. but also the world economy”. (OECD, 2013) In spite of these uncertainties, the Thai economy remains strong. In 2012, the Thai construction and mining industry accounted for 4.3 per cent of GDP and employed 6.6 per cent of the labour force (Bank of Thailand, 2013).

“Construction ... grew ... on account of expansion in the real estate sector and government infrastructure projects, such as the purple line of the BTS skytrain, flood-damage repairs, and investment in dam projects for flood prevention by both government and private sectors”. (Bank of Thailand, 2013, p. 22)

3.3 Labour market challenges for the travel and tourism and construction industries

According to the WTTC, travel and tourism will continue to be an important component of world GDP, employing one person out of every 11 in the world’s job market (2013, p. i). By 2023, it is forecast that 17.5 per cent of people working in Thailand will be in an occupation connected either directly or indirectly to travel and tourism (WTTC, 2013, p. 11). The emergence of different forms of demand-driven, sustainable tourism (e.g. eco-tourism, ethical and green tourism) will place considerable demands on Thailand’s workforce, and will place increasing burdens on the skills requirements and knowledge of people in this industry. These skills challenges and demands will not be too dissimilar to those found in the construction sector. As reported in *The Nation* newspaper, “... the main problems that need to be solved concern labour shortages and a lack of skilled workers”. (*The Nation*, 2013) This assessment is clearly recognized by the National Economic and Social Development Board (NESDB) (2011), which acknowledges that the “... shortage of skilled labor is a critical concern” to Thailand’s future (2011, p. vi).

Added to this is the realization that a move towards sustainable work practices will invariably lead to more and stronger pressures related to the training and retraining of the labour force, inevitably creating further skills shortages or gaps in the Thai economy. A skills shortage

occurs when the demand for workers for a particular occupation is greater than the supply of workers who are qualified, available and willing to work under existing market conditions, and if the supply is greater than demand then there is a surplus. Over time, the market might adjust in a number of ways, including price and/or quantity adjustment, and the imbalance clears. A skills gap refers to a situation where employers are hiring workers whom they consider under-skilled or that their existing workforce is under-skilled relative to some desired level. (Shah and Burke, 2003, p. v)

As the realization that actions need to be taken to protect the environment become increasingly pressing, the implementation of adaptation and mitigation policies will imply significant economic restructuring. These will bring substantial skills shortages and gaps in the Thai labour market. The effect of this will be an enormous burden on the various education and training sectors. A rapid response to these labour market pressures, sooner rather than later, will relieve substantial bottlenecks in the Thai labour market in the not too distant future.

Another dimension of this complex challenge is to understand the magnitude of these skills gaps and shortages. To do this, it is important to begin the creation of a database of green skills and jobs, which will allow labour economists to forecast what these skills gaps will be in the future. These forecasts will provide policy-makers with another tool to assist them in policy responses related to skills shortages and gaps. Furthermore, a solid understanding of the nature of skills shortages and gaps will assist educational practitioners in the development of tailored training and retraining courses to meet the increasing demand for green skills required in the Thai economy. These practices will also assist in the

understanding of regional green skills shortages and gaps, particularly as the ASEAN economic integration comes into effect at the end of 2015.

4. Methodology

The main purpose of this collaborative research was to identify the skills needs and gaps in the construction and tourism industries in Thailand, with a view to transform jobs in these industries into green jobs. The study was undertaken over a five-month period, between 1 July 2013 and 30 November 2013, with most of the qualitative data collected in late July and early August 2013. Thus, the objectives and purpose of this collaborative work were as follows:

- a) to analyse and describe the skills gaps and weaknesses of green jobs in the construction and tourism industries;
- b) to identify the skills needs in the priority occupations for construction and tourism;
- c) to identify and describe existing and emerging green jobs in construction and tourism, to assist in the creation of a database of “green skills”;
- d) to review the current skills and training system, in particular institutional capacities and skills and competency standards in the priority occupations in construction and tourism, and analyse if these standards have green-job components;
- e) to propose “skills for green jobs” responses (in terms of policies and programmes), in order to respond to the creation of new qualifications, and adjust existing qualifications in the priority occupations for construction and tourism; and
- f) to provide recommendations on the best way to integrate green skills and green-job components into Thailand’s skills and competency standards for selected priority occupations in construction and tourism.

The research was conducted using three major research techniques. The first used desktop research, which relies on obtaining critical information related to investigation of either published or non-published “secondary” sources of information. These secondary resources include official and unofficial reports, Internet searches, and analysis of the relevant academic literature on the emergence of green jobs or occupations. This methodology allows the researcher to: provide an overall and accurate review and analysis of the most pertinent information available; be able to cite the significant and appropriate information; and be able to report findings. An advantage of this methodology is that it is highly efficient and takes advantage of the latest research being undertaken. The information obtained consisted of an analysis of Thai and international literature, and incorporated both academic and policy-related works.

The second methodology consisted of interviews with key informants. These included: expert officers from the ILO; expert officers from the DSD, the Ministry of Labour; and industry representatives from the construction and tourism industries. The expert advice from the officials allowed the identification of a sample of eight construction and six tourism occupations.

The method used in the final part of the research involved the analysis of skills competency standards from around the world. From this information, “green competencies” were formulated from the sample of chosen occupations in the construction and tourism sectors.

5. Skills weaknesses and gaps in green jobs in tourism and construction

As indicated in Part 2, the first objective of this report is to analyse the skills gaps and weaknesses in a sample of priority occupations in the tourism and construction industries in Thailand. To begin to understand the skills gaps and weaknesses in green jobs, the ILO definition of “green jobs” was utilized as the baseline or frame of reference. This was done so that by having a defined benchmark, analysis of the skills gaps and weaknesses in the sample occupations could be performed. A rationale for this is that this method of analysis can also become the basis under which a set of “green skills” can be identified, thus assisting in the creation of a “green skills database”. Another advantage of having a baseline or benchmark is that the analysis conducted can then be replicated by Thai technical officers to analyse the skills gaps and weaknesses in occupations in other sectors such as manufacturing and retail, and other jobs in tourism and construction. Thus, central to the methodology adopted in the analysis, is the replication of the findings and methodology employed.

The ILO definition of “green jobs” assumes and implies that potentially every job in the economy can become “green”. The definition consists of three key components, and in order for any occupation to potentially become green, it must meet the ILO criteria of a green job, which consists of the following characteristics:

- a) the occupation must preserve and restore environmental quality;
- b) the occupation must meet the criteria of decent work – that is, adequate wages, safe conditions of work, workers’ rights, social dialogue, and social protection; and
- c) the occupation must involve direct activities of mitigation and/or adaptation to climate change.

5.1 Determining the sample of occupations in tourism and construction

In determining the sample of priority occupations for this analysis, the following steps were taken. First, a list of occupations was selected from the International Standard Classification of Occupations, 2008 (ISCO-08). This classification system was used as the starting point to select the occupations under investigation. Discussions with technical officers from the ILO and Thailand’s DSD revealed that this formed the basis for much of the occupational classifications used in Thailand and the ASEAN region. Furthermore, it was advised and recommended as a frame of reference for obtaining the sample of occupations under investigation in the tourism and construction sectors.

ISCO-08 is the ILO’s classification structure for organizing information on labour and jobs. According to the ILO, this classification structure belongs to widely known families of economic and social classifications and is recognized internationally. The ILO argues that ISCO-08 serves as a tool for classifying occupations in defined sets of groups, in terms of tasks and activities performed in different jobs.

ISCO-08 has the following characteristics, and provides:

- a) a basis for the international reporting, comparison, and exchange of statistical and administrative data about occupations;
- b) a basis for a model for the development of national and regional classifications of occupations;
- c) job descriptions; and
- d) a system that can be used directly in countries that have not developed their own national classifications (ILO, 2012a, p. 4).

ISCO-08 offers developing countries such as Thailand a host of labour market and educational functions and applications. Examples of these include the matching of job seekers with job vacancies, a source of reference to describe occupations, and the development of vocational training programmes and guidance (ILO, 2012a).

Using the ISCO-08 classification, 21 occupations were originally selected from the construction sector, and 30 from tourism. These were narrowed down to seven priority occupations in construction and six in tourism. While the sample of occupations appears to be small, the analysis was limited to the fact that the occupations chosen for analysis needed to be officially gazetted occupations. In other words, they had to be registered by the Skills Development Promotion Committee, National Skills Standards (Department of Skills Development, 2002). These conditions classified these occupations as “priority occupations”.

The data obtained was an excellent source of information because it consisted of over 100 pages of detailed, descriptive information related to the skills standards for each of the occupations under examination. A list of these is in Appendix I. The construction occupations were bricklayer (7112¹⁻²), computer aided designer (CAD) (3512-3), plasterer (7123-2), concrete tile roofer (7121-2), carpenter (7115-2), painter (7131-2), plumber (7126-2), and electrician (7411-2). In tourism, the sample consisted of room attendant (5151-2), baker (7512-2), Thai cook (5120-2), front desk receptionist (4224-2), Thai masseur (3259-3), and bartender (5132-2). The material in the description of each of the skills standards for each occupation was in the Thai language. These were expertly translated into English.

A particular characteristic of these jobs is that they are medium to low in terms of skill level as defined by ISCO-08. A skill level 3, or medium skill level, according to ISCO-08 is “... obtained as the result of study at a higher educational institution for a period of 1-3 years following completion of secondary education” (ISCO-08, 2012a, p. 13), or equivalent, whereas at level 2, or a low skill level, competence is often “... obtained through completion of the first stage of secondary education” (ISCO-08, 2012a, p. 12) or equivalent.

The advantages of analysing occupations at these levels of skill are:

- In the context of the emergence of green jobs, low- and intermediate-skilled occupations seem to be ignored in terms of the analysis of emerging green jobs.³
- There is evidence in the literature that the creation of high-skilled jobs has a spillover effect in terms of creation of occupations at lower skill levels (see for example, OECD, 1998 for a discussion on labour-market spillover effects). The creation of high-skilled occupations will therefore create “lesser skilled jobs” that will serve as support to high-level occupations.
- Medium- and low-skilled jobs are often at the frontline of sustainability, and the green skills required to perform these jobs need to be carefully considered, to understand their effect on environmental mitigation or adaptation, and the preservation and restoration of the environment.
- Understanding the green skills in these occupations is essential for the creation of training and retraining programmes at these skill levels, as well as the creation of a green skills database.

Table 2 below describes the skills gaps and weaknesses for bricklaying. The table is made up of two columns. Column 1 describes the ILO characteristics, which serves as the benchmark to describe a “green job”. Column 2, describes the gaps and weaknesses manifested in each of the characteristics. A skills gap or weakness manifests itself when there is no mention of the ILO definitional component in the Thai skills standard. So, when we look at the first characteristic, after having analysed the skills standards for bricklayers, the analysis shows that there is a gap or weakness in that particular characteristic. Hence, column 2 describes the gap for “preservation and restoration of environmental quality”. The description of the gap or weakness is therefore described in column 2 as “The document does not explicitly state issues related to the preservation and restoration of environmental quality.” For the characteristic of “mitigation and/or adaptation”, the skills gap or weakness is similarly described as “The document does not explicitly state issues related to mitigation and/or adaptation.”

¹ This four-digit code refers to the ISCO-08 occupational classification code.

² Refers to the ISCO-08 skill level. For a detailed description, refer to ILO, 2012a, p.14.

³ A more detailed discussion on emerging green jobs in the construction and tourism industries is discussed in chapter 7.

Table 2. Skill gaps and weaknesses for a sample occupation – bricklayer

Bricklayer: ILO green job characteristics	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to the preservation and restoration of environmental quality.
Decent work	
Adequate wages ⁴	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health and safety standards that need to be adhered to and are part of the training.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue ⁵	The document does not explicitly state issues related to social dialogue.
Social protection ⁶	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and/or adaptation.

Source: Author's arrangement.

Decent work contains four sub-characteristics: adequate wages, safe conditions, social dialogue, and social protection. Each of these is described below, with the corresponding analytical finding.

“Adequate wages” implies that the wage paid is a “living wage”, which is recognized as an international human right. The living wage includes wages and benefits paid for a standard working week. Its aim is to allow employees to earn enough income for an adequate standard of living, and is required to meet at least legal or industry minimum wage standards. It is important to note, however, that “... there is neither a generally accepted definition of what a living wage is, nor is there a generally agreed methodology on how to measure it”. (Anker, 2011, p. v)

In terms of skills gaps and weaknesses, adequate wages are assumed to be present in the two industries under investigation. As such, the weaknesses and skills gaps are described as “The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to Thai minimum wage legislative standards.” As such, in this analysis, it is assumed that the average Thai bricklayer in the Thai construction⁷ industry is not experiencing working conditions that are “... exploitative, harmful, or fail to pay a living wage (or worse, condemns workers to a life of poverty)”. (UNEP, ILO, IOE, ITUC, 2008, p. 39)

In terms of safe conditions for this occupation, the skills standards for bricklayers have descriptions of required knowledge and skills related to occupational health and safety provisions. As such, the skills

⁴ Thailand introduced a nationwide minimum wage in January 2013.

⁵ The UNEP, ILO, IOE, ITUC, Green Jobs. Social dialogue is seen as an important component, especially at work. It refers to the input of the worker/union “... to help determine the design of new sustainable production systems and work practices. These committees could work to identify ways to improve energy efficiency, more efficient use of water and other natural resources and raw materials, and low-carbon work schedules”. (2008, p. 27)

⁶ Includes “income protection as well as adequate retraining and educational opportunities and, where necessary, resources for relocation”. (2008, p. 308)

⁷ The conditions of migrant workers were not included in this analysis due to data limitations and scope of the study, although it is widely acknowledged that these workers experience disadvantage in Thailand.

gaps and weaknesses are assessed as “The document contains elements of occupational health and safety standards that need to be adhered to and are part of the training.” In terms of workers’ rights, the document does not specifically state that workers have safe conditions in this occupation, and the skills gaps and weaknesses are described as “The document does not explicitly state issues related to workers’ rights.”

“Social dialogue” refers to the input of the workers or union “... to help determine the design of new sustainable production systems and work practices. These committees could work to identify ways to improve energy efficiency, more efficient use of water and other natural resources and raw materials, and low-carbon work schedules”. (2008, p. 27) The skills standards document did not include a provision for this, and as such the skills gaps and weaknesses are described as “The document does not explicitly state issues related to social dialogue.”

Finally, the component of social protection implies the presence of “income protection as well as adequate retraining and educational opportunities and, where necessary, resources for relocation”. (2008, p. 308) This component was missing in the skills standards for bricklayers, and as a result the skills gaps and weaknesses are assessed as “The document does not explicitly state issues related to social protection.”

Appendix II lists the skills weaknesses and gaps for all the occupations under investigation.

6. Skills needs in construction and tourism priority occupations

The previous section identified the skills gaps and weaknesses for each of the priority jobs in construction and tourism. This section looks at the skills needs of each of the occupations by matching each of the components that make up a competency to the components that make up the ILO definition of green skills. This process addresses each of the green gaps or weaknesses in each of the priority occupations. By creating, green units of competency for each job, we tackle the skills gaps and weaknesses discussed in the previous section, and in so doing, the priority jobs can be transformed into green jobs. Each unit of competency has nine components. These are detailed in table 3 below.

Table 3. Components of units of competency

Unit title and definition	This is an alpha-numeric code that follows ILO guidelines, accompanied by a short title that summarizes the main job function covered by the unit. The unit title is a succinct statement of the outcome of the unit of competency. Each unit of competency contains a description of the occupation.
Unit descriptor	A short statement giving a more detailed description of the job function covered by the unit. The unit descriptor broadly communicates the content of the unit of competency and the skills and knowledge areas it addresses.
Employability skills	These are skills that are not specific to work in a particular occupation or industry, but are important for work, education, further training, and life in general. The units contain eight employability skills: communication, teamwork, problem solving, imitative and enterprise, planning and organization, self-management, learning, and technology. Employability skills are transferable. They contain elements that can be related to the three components of the ILO “green jobs” definition.
Elements of competency	The major elements of the job function. These describe in output terms what a person is able to do in a particular area of work. The elements of competency are the basic building blocks of the unit of competency. They describe, in terms of outcomes, the significant functions and tasks that make up the competency. These have been written to match the three criteria components that correspond to the definition of a green job (ILO, 2011, p. 4) and are summarized in table 2. Each of the elements corresponds to one of these criteria.
Performance criteria	This relates to the performance standards or tasks that are involved in each of the relevant job functions. It describes how well the work should be performed, and allows for measurable outcomes. The performance criteria specify the required performance in relevant tasks, roles, skills, and in the applied knowledge that enables competent performance. These have been written to match the three criteria components that correspond to the definition of a green job (ILO, 2011, p. 4) and are summarized in table 2. Each of the elements corresponds to one of these criteria.
Required skills and knowledge	These are statements that outline key skills and required knowledge for the job function covered by this unit. The essential skills and knowledge are identified separately. Knowledge identifies what a person needs to know to perform the work in an informed and effective manner. Skills describe the application of knowledge to situations where understanding is converted into a workplace outcome. Each of the written knowledge and skills components correspond to the definition of a green job (ILO, 2011a, p. 4). The three components are summarized in table 2.
Evidence guide	The evidence guide describes: <ul style="list-style-type: none">• conditions under which a competency must be assessed, including variables such as the assessment environment or necessary equipment;• suitable methodologies for conducting assessment including the potential for workplace simulation;• resource implications – for example, access to particular equipment, infrastructure, or situations; and• the required underpinning knowledge and skills.
Method of assessment	Describes the range of assessment methods that are available to assess the unit of competency.
Range statement	These statements clarify the scope and range of performance, including clarification on contexts, operations, and equipment referred to in the performance criteria. The range statement provides a context for the unit of competency, describing essential operating conditions that may be present with training and assessment.

Source: Adapted from CPC08 Construction, Plumbing, and Services Training Package, Released 8, 13 April 2013, pp. 388-392; SIT12 Tourism, Travel, and Hospitality Training Package, pp. 233-237; and NCS, 2005.

The methodology employed to transform the unit of competency into a green unit of competency is as follows. Key components of the competency address the three characteristics of green jobs as described in table 2 in the previous section.

The first two components, unit title and definition, and unit descriptor, are descriptive in nature. Employability skills contain eight transferable skills, which address the three components of the ILO

definition. For example, the employability skills “initiative and enterprise” is made up of two skills. These skills, “Responds positively to environmental workplace changes and challenges” and “Identifies opportunities and maximizes use of resources by recycling, re-using, or using appropriate disposal methods, and puts sustainable workplace suggestions into action,” address aspects related to the three components of the ILO definition. The other employability skills also comply with the ILO definition, either partly or as a whole.

The fourth competency components are known as the “elements and performance criteria” of the competency. These components describe what the worker is able to do in a particular area of work, while the performance criteria describe how well the work should be completed. Each of these elements addresses aspects of the ILO skills definition. While these components are the same, they are not uniform across tourism and construction occupations, as each consider particular aspects of the given occupation table 4 describes these.

Table 4. Competency “element match” with ILO definitional component

Competency element	ILO definitional component
Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	Preservation and restoration of environmental quality (1).
Comply with Thai regulations and prepare for work following green environment conventions.	Decent work (2)
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	Mitigation and/or adaptation (3).
Clean up.	(1) and (3).
Waste disposal.	(1) and (3).

Source: Author's arrangement.

For “Required skills and knowledge” in construction, these components are arranged under each of the ILO component definitions. These are illustrated in table 5. For tourism, these elements vary slightly in descriptive form from those in construction jobs, but are arranged in the same way.

Table 5. Required knowledge and skills competency components

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
- Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
- Basic knowledge on how best to minimize waste and pollution in the workplace.
- Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
- Site layout, including location of rubbish disposal bins, is clearly understood.
- Application of relevant environmental protection regulations and requirements.
- Knowledge of environmental and resource hazards or risks, and inefficiencies associated with own workplace.

Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
- Environmental risks and protection standards are adhered to when carrying out workplace operations.
- Procedures and processes for waste and effluent regulation where applicable.

Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
- Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
- Able to identify and implement procedures that minimize waste and pollution in the workplace.
- Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
- Work collaboratively with others when caring for the environment.

Mitigation and adaptation

- Promptly report and/or rectify any identified problems that may arise when caring for the environment in accordance with regulatory requirements and workplace procedures.
- Implement contingency plans for unanticipated situations that may occur when caring for the environment.
- Recognize potential pollution risks and ways of minimizing them.
- Follow routine service and maintenance procedures for equipment and vehicles.

Source: Author's arrangement.

The three final elements, “evidence guide”, “method of assessment”, and “range statement”, are job specific and vary according to the work activities, tasks, skills, and knowledge that need to be considered in each occupation.

7. Emerging green jobs in the construction and tourism industries

7.1 Background

The previous two sections dealt with the identification of skills gaps or weaknesses, and addressing the skills needs for green jobs. In order to respond to the skills gaps or weaknesses, the skills needs of each occupation were addressed by creating green competency units for each of the priority jobs identified. This part of the analysis, on the other hand, gathers information in order to identify and describe the existing and emerging green jobs in the construction and tourism industries. The principal aim of this exercise is to assist in the creation of a database of green skills. To respond to this challenge, a taxonomy of emerging green jobs and new jobs was created using the ISCO-08 occupational classification and international resources such as the US Department of Labor Information Occupational Network (O*NET), which have identified emerging and new green jobs and job advertisements found on the Internet.

7.2 Drivers of occupational and economic change: Towards emerging and new green occupations

The ILO report “Skills for Green Jobs” (2011a) identified four main drivers of change in skills requirements. These drivers are: changes in the physical environment; environmental policy and regulation; technology and innovation; and changes in prices, markets, and consumer habits (p. 8).

Changes in both the built and natural environment have a direct impact on economic and social activity. As described earlier, this is being driven by climate change, which is having a powerful effect on people not only economically and socially, but also in the ways in which they are required to adapt to these changes. Responding to these massive challenges requires: “The implementation of alternative energy solutions to avoid the damaging effects of fossil fuel use require not only installation and maintenance skills but also research and development skills, both to make the new technologies affordable and accessible for all and to replace scarce resources”. (p. 8)

Environmental policy and regulation is a powerful weapon that governments possess to affect directly and sometimes indirectly the environmental outcomes of countries and regions. “Governments thus play a crucial role in driving behavioural change on the part of both business and consumers, not only through legislative prohibitions but by providing both incentives and disincentives”. (p. 9)

Examples of government incentives include the implementation of human capital policies that are geared at training the labour force with a set of specific green skills that make the labour force more productive and responsive to climate change challenges. Furthermore, governments can, for example, create disincentives to reduce carbon emissions by placing taxes or heavy penalties on heavy polluters.

Technology and innovation are also strong drivers of skills change and development. The challenge is to be innovative and inventive, to adopt new technologies and workplace innovations that assist in both mitigation and adaptation to climate change. Thus, having a highly educated labour force is central to adjust to the emergence of new technologies and innovative work practices. “New technology can be developed through innovation or it can be acquired and adopted. The appropriate skills and competencies for the development, dissemination and adoption of technology are crucial for the transfer of technology, either from firm to firm or from one country to another”. (p. 10)

Consumer demand, businesses, and market forces are also major drivers of change and adaptation.

The market for greener products and services is itself driving change in skill needs. Devices to enhance energy efficiency sell on the market; regulations to promote renewable energies in various countries create market opportunities for producers of renewable energy technology worldwide. Making the most of these market openings requires staff with appropriate skills to develop businesses. ... New markets and business opportunities are often opened up by special incentives, such as those provided by green stimulus packages, and investment opportunities in countries with abundant and cheap labour (ILO, 2011a, p. 11).

These four drivers of change are interdependent and can have a positive effect on skills improvements for developing countries. Countries such as Thailand have shown that they can easily adapt to these drivers of change by pursuing proactive policies for lifelong learning, which consist of a continuous process of investments in education, and the training and retraining of its population. A continuation of the pursuit of lifelong learning policies is one approach that can be used to transform Thailand into a green economy (NESDBOPM, 2011).

7.3 A taxonomy of Thai green occupations

The purpose of this part of the report is to provide taxonomies for two types of green occupations. Most countries around the world have taxonomies of occupations, but to date there are few that catalogue green occupations. An occupational taxonomy is a method of classifying occupations according to similarities of structure.

A report by Ehmcke et al. (2009) proposed an Australian taxonomy for green jobs. This was based on the existing Australian and New Zealand Standard Classification of Occupations (ANZSCO), the occupational classification; the Australian and New Zealand Standard Industrial Classification (ANZSIC), the occupational industry classification; and the Australian Qualification Framework (AQF). The taxonomy provided information about the sustainable properties of green jobs.

The taxonomy of Thai green jobs that is presented below is based on the two industry categories: construction and tourism. The approach taken to assemble the list of occupations is to divide the occupations into two categories.

The first takes all the occupations in tourism and construction⁸ under the ISCO-08 classification that can be transformed into green jobs. This is based on the ILO assumption that all jobs can potentially be transformed into green jobs. This can be achieved by applying the methodology described in chapter 6. These occupations are called “potentially green”.

The second is based on lists of occupations provided by the O*NET. These occupations are the new or emerging green jobs, whose skills sets respond to changes in the drivers of occupational and economic change described in section 7.2 for Thailand. The O*NET definition of “green construction” covers occupations involved in “... activities related to constructing new green buildings, retrofitting residential and commercial buildings, and installing other green construction technology”. (Dierdorff, et al. 2011, p.11)

“Sustainable tourism” has been defined as “Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities”. (UNWTO and UNEP, 2005, p. 12)

Table 6 presents a list of occupations that can be transformed into green jobs for construction and tourism. The list of occupations contains the ISCO-08 code, occupational title, and ISCO-08 skill level. The ISCO-08 skill level is made up of four categories – Level 1 being the lowest, and Level 4 being the highest. According to ISCO-08 (ILO, 2012a, pp. 11-13), an occupation at Level 1 (low skilled) typically

⁸ Refer to chapter 5 for a discussion on the definitions used for the construction and tourism industries.

involves the performance of simple and routine physical or manual tasks; an occupation at Level 2 (moderately skilled) involves tasks that include the operation of electrical and mechanical equipment, and manipulation, ordering, and storing information; an occupation at Level 3 (high skilled) involves tasks that are complex and technical and require high levels of literacy and numeracy, as well as sound interpersonal skills; and an occupation at Level 4 (very high skilled) involves complex problem-solving, decision-making, and creative task performances.

Table 6. List of potentially green occupations in construction and tourism

Construction occupations ISCO 08 code	ISCO-08 occupation title	ISCO-08 skill level
1322	Mining managers	4
1323	Construction managers	4
1323	Construction managers	4
2142	Civil engineers	4
2143	Environmental engineers	4
2161	Building architects	4
2162	Landscape architects	4
2164	Town and traffic planners	4
2165	Cartographers and surveyors	4
2359	Teaching professionals not elsewhere classified	4
3117	Mining and metallurgical technicians	3
3118	Draughtspersons	3
3119	Physical and engineering science technicians not elsewhere classified	3
3121	Mining supervisors	3
3123	Construction supervisors	3
3133	Electrical engineers	3
5153	Building caretakers	2
7111	House builders	2
7112	Bricklayers and related workers	2
7113	Stonemasons, stone cutters, splitters, and carvers	2
7114	Concrete placers, concrete finishers, and related workers	2
7115	Carpenters and joiners	2
7119	Building frame and related trades workers not elsewhere classified	2
7121	Roofers	2
7122	Floor layers and tile setters	2
7123	Plasterers	2
7124	Insulation workers	2
7125	Glaziers	2
7126	Plumbers and pipe fitters	2
7131	Painters and related workers	2
7132	Spray painters and varnishers	2
7133	Building structure cleaners	2
7211	Metal moulders and coremakers	2
7212	Welders and flamecutters	2
7213	Sheet-metal workers	2
7214	Structural-metal preparers and erectors	2
7215	Riggers and cable splicers	2
7411	Building and related electricians	2
7544	Fumigators and other pest and weed controllers	2
8111	Miners and quarriers	2
9311	Mining and quarrying labourers	1
9312	Civil engineering labourers	1
9313	Building construction labourers	1

Tourism occupations		
ISCO 08 code	ISCO-08 occupation title	ISCO-08 skill level
1411	Hotel managers	4
1412	Restaurant managers	4
2263	Environmental and occupational health and hygiene professionals	4
3434	Chefs	3
4221	Travel consultants and clerks	2
4224	Hotel receptionists	2
4226	Receptionists (general)	2
5120	Cooks	2
5131	Waiters	2
5132	Bartenders	2
5151	Cleaning and housekeeping supervisors in offices, hotels and other establishments	2
5152	Domestic housekeepers	2
5162	Companions and valets	2
5211	Stall and market salespersons	2
5222	Shop supervisors	2
5223	Shop sales assistants	2
5242	Sales demonstrators	2
5246	Food service counter attendants	2
5311	Child care workers	2
6113	Gardeners, horticultural, and nursery growers	2
7317	Handicraft workers in wood, basketry, and related materials	2
7318	Handicraft workers in textile, leather, and related materials	2
7511	Butchers, fishmongers, and related food preparers	2
7512	Bakers, pastry-cooks, and confectionery makers	2
7531	Tailors, dressmakers, furriers, and hatters	2
7541	Underwater divers	2
8152	Weaving and knitting machine operators	2
9214	Garden and horticultural labourers	1
9411	Fast food preparers	1
9520	Street vendors (excluding food)	1

Source: Author's selections, ISCO-08, 2012.

Table 7 lists construction occupations, and is made up of six columns. The O*NET occupations have been assigned a corresponding ISCO-08 occupational title. Columns 1 to 2 describe the O*NET occupational title with its corresponding O*NET green category. The last column lists the two proposed categories of Thai green jobs, which are classified as “potentially green”. The occupations that are already classified as “Green Enhanced Skills” and “Green New and Emerging” are classified as “Emerging or New” green occupations for Thailand.

The O*NET has three green categories, and their definitions are described below.

Green Increased Demand Occupations. The effect of green economy activities and technologies is an increase in the employment demand for an existing occupation. However, this effect does not entail significant changes in the work and worker requirements of the occupation. The work context may change, but the tasks themselves do not.

Green Enhanced Skills Occupations. The effect of green economy activities and technologies results in a significant change to the work and worker requirements of an existing O*NET-SOC occupation. This effect may or may not result in an increase in employment demand for the occupation. The essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements such as credentials, have been altered.

Green New and Emerging (N&E) Occupations. The effect of green economy activities and technologies is sufficient to create the need for unique work and worker requirements, which results in the generation of a new occupation relative to the O*NET taxonomy. This new occupation could be entirely novel or “born” from an existing occupation (Dierdorff, 2009, p. 4).

To simplify our category of proposed green job classifications for Thailand, the O*NET definitions of Green Enhanced Skills Occupations and Green New and Emerging Occupations are combined to create the Thai definition of “Emerging or New Thai Green Occupations”. Column 5 lists two categories of green jobs, namely, “potentially green” or “emerging or new green jobs”.

Table 7. Potentially green and emerging and new occupations in the Thai construction industry

O*NET-SOC title	O*NET green category	ISCO-08 occupational title	ISCO-08 skill level	Proposed green job classification for Thailand
Architectural drafters	Green increased demand	Draughtspersons	3	Potentially green
Boilermakers*	Green increased demand	Metal moulders and coremakers	1	Potentially green
Cement masons and concrete finishers	Green increased demand	Stonemasons, stone cutters, splitters, and carvers	1	Potentially green
Construction carpenters	Green increased demand	Carpenters and joiners	1	Potentially green
Electricians	Green increased demand	Building and related electricians	1	Potentially green
Helpers-carpenters	Green increased demand	Building construction labourers	1	Potentially green
Helpers-installation, maintenance, and repair workers	Green increased demand	Building construction labourers	1	Potentially green
Insulation workers, floor, ceiling, and wall*	Green increased demand	Floor layers and tile setters	2	Potentially green
Labourers and freight, stock, and material movers, hand*	Green increased demand	Building construction labourers	2	Potentially green
Rough carpenters	Green increased demand	Building frame and related trades workers not elsewhere classified	2	Potentially green
Solderers and brazers*	Green increased demand	Welders and flamecutters	2	Potentially green
Structural iron and steel workers*	Green increased demand	Structural-metal preparers and erectors	2	Potentially green
Structural metal fabricators and fitters*	Green increased demand	Structural-metal preparers and erectors	2	Potentially green
Welders, cutters, and welder fitters*	Green increased demand	Welders and flamecutters	2	Potentially green
Architects, except landscape and naval*	Green enhanced skills	Building architects	4	Emerging or new

Civil engineers*	Green enhanced skills	Civil engineers	4	Emerging or new
Construction and building inspectors*	Green enhanced skills	Construction supervisors	3	Emerging or new
Construction labourers	Green enhanced skills	Building construction labourers	1	Emerging or new
Construction managers*	Green enhanced skills	Construction managers	4	Emerging or new
Electrical engineers*	Green enhanced skills	Electrical Engineers	3	Emerging or new
Hazardous materials removal workers*	Green enhanced skills	Building construction labourers	1	Emerging or new
Landscape architects*	Green enhanced skills	Landscape architects	4	Emerging or new
Pipe fitters and steamfitters	Green enhanced skills	Plumbers and pipe fitters	2	Emerging or new
Plumbers	Green enhanced skills	Plumbers and pipe fitters	2	Emerging or new
Roofers	Green enhanced skills	Roofers	2	Emerging or new
Training and development specialists*	Green enhanced skills	Teaching professionals not elsewhere classified	4	Emerging or new
Urban and regional planners*	Green enhanced skills	Town and traffic planners	4	Emerging or new
Energy engineers*	Green new and emerging	Not catalogued	4	Emerging or new

Source: Author's selections, using ISCO-08 2012, and Dierdorff, et al. (2011). *Refers to occupations that belong to more than one industry

Most of the emerging or new green occupations are found in “green construction”, while a handful of green tourism occupations are found in the O*NET. This list of occupations is supplemented by “new green tourism” occupations that have been advertised on the Internet, and are not listed in the ISCO-08 classification. The O*NET did not have a list of occupations for sustainable tourism, so a search of job advertisements was conducted to provide a list of occupations, of which the vast majority have not yet been classified in any of the various lists of international occupational classifications mentioned above. To obtain the occupations listed in table 8, the Ehmcke et al. (2009) methodology is employed (see pp. 34–38 for a detailed explanation).

Table 8. List of new or emerging green tourism occupations

Occupational title ⁹	ISCO-08 code	ISCO-08 occupational title	ISCO-08 skill level	Proposed green job classification for Thailand
Adventure/sustainable tourism officer			3	New or emerging
Biodiversity conservation consultant	2131	Biologists, botanists, zoologists, and related professionals	4	New or emerging
Biodiversity consultant	2131	Biologists, botanists, zoologists, and related professionals	4	New or emerging
Biodiversity strategy consultant	2131	Biologists, botanists, zoologists, and related professionals	4	New or emerging
Conservation/tourism officers			2	New or emerging
Conservation programme director			4	New or emerging
Cultural tour directors			4	New or emerging
Cultural tourism director			4	New or emerging
Cultural tourism research Assistant			2 or 3	New or emerging
cultural volunteer Programme Coordinator			2 or 3	New or emerging
Eco-lodge manager			2	New or emerging
Eco-tour guides			4	New or emerging
Ecotourism business assistants			2	New or emerging
Ecotourism development officer			3	New or emerging
Ecotourism guide			2	New or emerging
Ecotourism manager			4	New or emerging
Ecotourism officer			2	New or emerging
Ecotourism project team leader			3	New or emerging
Environmental field instructor		Environmental protection professionals		New or emerging
Heritage tourism manager			4	New or emerging
Heritage tourism program manager			4	New or emerging
Marine protected area coordinator			3	New or emerging
National park ecotourism advisor	2133	Environmental protection professionals		New or emerging
Naturalist	2133	Environmental protection professionals	4	New or emerging
Nature hotel manager			4	New or emerging
Nature reserve manager			4	New or emerging
Nature reserve officer			2	New or emerging
Nature tourism analyst			4	New or emerging
Sustainable tourism consultant	2133	Environmental protection professionals	4	New or emerging
Sustainable tourism director	2133	Environmental protection professionals	4	New or emerging
Sustainable tourism manager	2133	Environmental protection professionals	4	New or emerging
Sustainable tourism NGO Marketing director	2133	Environmental protection professionals	4	New or emerging
Sustainable tourism policy analyst			4	New or emerging
Sustainable tourism researchers			3 or 4	New or emerging

⁹ The majority of these occupations have been sourced from International Ecotourism Club's Ecotourism Job Centre.

Wilderness guides	2133	Environmental protection professionals	2 or 3	New or Emerging
Wildlife conservation programme director	2133	Environmental protection professionals	4	New or Emerging
Wildlife park manager (Tourism development)	2133	Environmental protection professionals	4	New or Emerging

Source: Author's selections, using ISCO-08, 2012, and Dierdorff, et al. (2011) and the Internet.

This section has proposed a framework for creating a database of green occupations made up of two categories. It is important to note that these categories can also include more categories. The rationale for having two categories – new or emerging, and potentially green – is that it serves as a starting point to classify occupations. More sophisticated and detailed categories will emerge as the low-carbon economy evolves, but the underlying thinking is to begin to provide a conceptual framework for classifying green jobs.

Using the ISCO-08 occupational classification is a starting frame of reference for classifying green jobs. The methodology adopted based on ISCO-08 could become a useful model for classifying new and emerging green occupations in Thailand. The O*NET, on the other hand, can be used to start cataloguing new green occupations in Thailand that begin to emerge as a result of new technologies, the implementation of innovative work arrangements, and the application of new regulatory arrangements.

8. Institutional capacities and skills standards

8.1. Technical and vocational education and training (TVET): A critical view¹⁰

Two sectors operate within Thailand's technical and vocational education and training (TVET) system: the formal and the informal. The TVET system is made up of hundreds of formal and non-formal training establishments throughout the country. The formal sector has three modes of delivery: upper secondary, post-secondary, and university level. The informal sector, on the other hand, is more flexible in terms of delivery and curriculum structure.

Another dimension to the TVET system is the dual vocational training (DVT) system, which operates under the jurisdiction of the Office of the Vocational Education Commission (OVEC), which works closely with the private sector in the provision of industry-based training. A function of the OVEC is to develop formal policy and standards, and provide resources (financial and pecuniary) for TVET. It is also involved in the development of programmes that target social issues such as poverty alleviation and other relevant social services. Its organizational structure consists of eight bodies: the Vocational Education Committee; the Bureau of General Administration; the Bureau of Policy and Planning; the Bureau of Vocational Education Standards and Qualifications; the Bureau of Cooperation; the Bureau of Personal Competency; and the Bureau of Research and Development.

8.2. Department of Skills Development (DSD)

The DSD operates under the Thai Ministry of Labour. Its main functions are to administer and promote schemes related to skills development and promotion. Its central responsibilities are training, retraining, and upgrading the skills of the workforce in order to meet the demands of a continuously changing labour market. It has five specific responsibilities:

- a) to promote the competency levels of Thailand's workforce;
- b) the development of skills standards, promotion, and testing;
- c) promote cooperation between the public and private sectors in terms of networking and drafting of national plans to respond to changing skills demands;
- d) to oversee the Skills Development Promotional Act (2002) and relevant labour law; and
- e) to promote and enhance skills development networks both at the national and international level (Huang, 2012, p. 29).

8.3. Skills standards limitations

The main limitation found in the analysis of skills standards in the priority occupations developed by the DSD is that, on the whole, they did not contain explicit mention of skills or competencies that were related to the concept of green skills or occupations or sustainable skills or occupations. Although some skills standards did mention (in an indirect manner) some green components, most of which were about cleaning, these did not contain a clear green rationale. Indeed, little attention is placed in an explicit manner on the role that green sustainable jobs or skills play in the skills standards analysed.

This finding is not surprising, but it should not be taken as a negative criticism of the operations of the DSD in relation to green skills or sustainability. While environmental education can now be found in the mainstream of education and training in many developed countries, and to some extent in a few developing countries, the concept is not yet part of the mainstream educational sector. However, there are signs that the concept is beginning to take hold in some areas of education in Thailand (see, for example, ILO 2011a, p. 135). Although some practices in sustainability are now being implemented,

¹⁰ This part of the analysis draws on the work of Huang (2012).

on the whole these have been driven, as in other parts of the world, by private-sector initiative (see the case study for the Dusit Thani Hotel).

8.4. Skills adaptation towards a low-carbon economy

Moving towards a low-carbon economy is a complex process, and the role of government institutions in fostering and promoting labour market change is crucial. As such, it is important that governments begin to take an active role in implementing labour market strategies to assist the labour market to transition to a low-carbon and sustainable economy.

The optimal role for green-specific labour market measures is likely to emerge only incrementally as the environmental policy framework needed to support green growth develops and experience with managing the labour market dimension of the transition to green growth accumulates. The OECD questionnaire reveals that about 60% of the responding countries have implemented at least one labour market measure targeted on green growth, but the number of such initiatives is still limited and most are relatively new and small in scale (OECD, 2012, p. 12).

In this transition towards a low-carbon economy, it is essential to draw from the experience of those countries that have been proactive in taking initiatives towards a low-carbon and sustainable economy. The ILO (2011a), in its international analysis of pathways to skills development, reviews the key players and practices undertaken to address skills shortages and skills gaps arising out of a shift towards a greener economy (2011a, pp. 127-143). In its international country review analysis, five response levels are identified: enterprises; enterprises within specific industries; government – namely national, regional, and local; educational institutions such as schools, universities, research centres, and various training providers; and non-state actors and international development partners such as non-government organizations (NGOs) (p. 128).

Enterprise level

Skills needs are a major challenge at the enterprise level. Opportunities taken up by businesses are mostly driven by the emergence of new markets and consumer demand, which often activate new production methods and processes. To meet these new market and consumer needs, firms have internally adapted informal training arrangements. For specialist emerging skills, many companies have chosen to create specialized training courses in order to train staff. The funds for these courses are, on the whole, met by the company. Crucial to the successful delivery of these training programmes in private companies is the role of proactive human resource departments. It is also noted that close collaboration between the private sector and public and private training providers can be a successful strategy to tackle skills bottlenecks and gaps.

Industry level

Green skills needs are magnified at the industry level. To respond to these challenges, the ILO identifies five institutional response mechanisms:

- Initiatives by industry associations can play a key role in responding to, and identifying, skills needs, and responding to increasing demands.
- Initiatives by skills councils can assist in improving the skills capacity of industry. For example, Australia's Industry Skills Council, the national peak body representing 11 separate industry skills councils, plays a central role in coordinating responses to sustainable skills requirements in the workforce. To respond to skills challenges, the council provides and facilitates independent skills and training advice to enterprises, matching identified training needs with appropriate training solutions (ISC, 2013).
- Another key player identified at the industry level are chambers of commerce or industry, which can make important contributions to the "greening" sectors by actively participating and

influencing policy issues such as skills development and cooperation in areas such as energy efficiency and renewable energy.

- Joint initiatives at industry level have had positive outcomes as well. Examples of these include the creation of industry training centres that are designed to train and retrain the workforce in new and emerging sustainable areas.
- Finally public and private partnerships have played an important role in the skills development of the workforce, as a response to new environmental challenges.

Government responses

Government responses have been identified at three levels: national, regional, and local. Government educational institutions are responsible for coordinating the creation and upgrading of national qualifications, curricula, and the financing of the educational sector. Six types of responses were identified. The first deals with the formal training system, and concentrates in two main areas: updating existing courses, and creating new qualifications.

The second deals with the area of general education and teacher/trainer training. These forms of training are provided through the school and tertiary education system, in order to mainstream environmental education into the school and university curriculum. Initiatives by government ministries and bodies also play an important role in the transition to a green, sustainable economy. For example, Thailand

provides some interesting examples of training in specific skills for an entire sector. The Ministry of Energy launched an initiative to train technicians at industry and village level, jointly with training instructors, in energy management and technology, end-use systems in companies and buildings, and the production process. It also constructed an eco-efficient house as a showcase for training purposes and to encourage technology transfer. Also, the Ministry of Tourism and Sports organizes training courses on eco-tourism¹¹ in selected villages in which villagers learn the skills they need to work as tour guide, tour operator, environmentalist, wildlife and environment conservationist or hotel manager (ILO 2011a, p. 135).

Industrial and innovation policies led by governments also play an important role. This may include publicly funded research, as well as subsidies designed to stimulate the private sector to adopt new technologies or to research and develop new technologies and green strategies.

Finally, regional and local governments can provide innovative and successful responses. In many developed countries, much of this work has been done either independently or in collaboration with central governments.

Tertiary institutions: Universities, training providers, and research centres

Private or public educational institutions provide responses to changing skills needs by creating courses that respond to the skills needs that are generated either via technological change, environmental legislation requirements, or industry needs. Three approaches have commonly been identified by the ILO. The first is the updating and creation of new courses and degrees to meet the sustainable green environmental needs created by technological innovation, government regulatory requirements, and industry demands or initiatives. The second is the take up of educational institutions forming collaborative partnerships with the private sector to align the provision of training with industry requirements. This often occurs via the creation of partnerships between educational institutions and private-sector entities. Finally, research institutions are responsible for the creation and dissemination of new knowledge. This work is at times conducted in collaboration with government agencies or private enterprises, with a view to addressing problems related to sustainable production methods and addressing climate change.

¹¹ See the Dusit Thani Hotel case studies.

Non-government organizations and international development partners

Outside the framework of major international institutions such as the United Nations and the World Bank, there exists a large spectrum of voluntary organizations and networks based on the common interests and goals of its members. Known as NGOs, their main function seems to provide structures for the promotion of civil society issues, whereby people and organizations can provide views and influence world opinion, and regional and national governments at different levels, on a variety of issues including the environment, peace, poverty, education, and social justice. These organizations have the ability to contribute to skills improvement for green jobs. This work is often conducted with the aid of international organizations, with a view to assist development in developing countries. NGOs often take a lead role in situations where the local formal training system is non-existent or insufficient.

In developing and emerging economies, international development partners play an important role in funding skills development for new green activities, occupations or sectors, or in providing training for new skills unavailable in the country. They usually work in partnership with national authorities, institutions of the formal training system, businesses or other stakeholders (ILO, 2011a, p. 140).

8.5. Concluding remarks

This section has reported on the limitations of the skills standards in the priority occupations for Thailand. It has found that green skill components were not explicitly stated in the skills standards. While this may be seen as a negative critique of the system, it should not be regarded as a major limitation. As stated earlier, moving towards a low-carbon economy is a complex process. Thailand is to some degree already embracing the concept. An example of this was cited by the ILO (2011a) report, which provided examples of initiatives by the Ministry of Energy and the Ministry of Tourism and Sports. While these are excellent initiatives, a more coordinated, holistic, and eclectic approach is required. One way of doing this is by ensuring the implementation of a recognized National Qualifications Framework (NQF) that contains sustainable green skills components throughout, solidly supported by a National Skills Agreement.

9. Thailand's skills and training system and institutional capacities

As discussed in section 3.3, the principal challenges faced by the tourism and construction labour markets, and for that matter the Thai labour market as a whole, are labour shortages, skills gaps, and a lack of skilled workers with green or sustainable knowledge and skills. Thailand's economy has experienced a long and sustained period of economic growth, which has placed major demands on the supply of labour. The country is currently enjoying one of the lowest unemployment rates in Asia, and the world, hovering at around 0.5 per cent in the last quarter of 2012 (Bank of Thailand, 2013, p. p. 53). With such a low level of unemployment, the Thai labour market faces severe constraints in the supply of skilled labour. With the emergence of green jobs, these supply constraints will become even stronger, particularly in expanding sectors such as construction and tourism; "... skills shortages can arise within certain sectors or industries requiring specific sets of skills, and they may be a lack of trained workers to fill these. Thus, levels of relevant education and training across a workforce are clearly important factors in the ability of employers to match vacancies to workers". (Fien, 2013, p. 19)

Thus, a major policy intervention approach required of Thai authorities is to implement policy measures that will increase the supply of green skills and other skills as a whole. A green skills policy will characteristically involve high levels of investments in training and retraining of the labour force, and should consist of public investments in universities, TVET, and schools. For the tourism and construction sectors, the goal is to target these investments in the area of vocational education, with strong participation by the private sector. As such, a continuation of a policy and vision designed to continually improve the human capital of the Thai people is essential, as explicitly stated in the Eleventh National Economic and Social Development Plan (2012–16): "To develop people with integrity, knowledge and skills appropriate to the age of each, and to strengthen social institutions and local communities to ensure positive adaptation to changes". (NESDB, 2011, p. x)

9.1. A mechanism for improving Thai human capital: The National Qualifications Framework (NQF)

To develop and achieve the above mission, the government of Thailand requires the formalization of its own NQF (Royal Thai Government, 2013). The NQF is a tool and mechanism designed to improve the skills, knowledge, and abilities of Thailand's workforce. It has two main aims: to improve the quality of Thailand's labour force, and to assist in the transition towards the formation of the ASEAN community in 2015 (Huang, p. 46).

The NQF specifies and delivers a thorough and comprehensive, nationally coherent, and uniform framework for all qualifications in education and training in Thailand. The significance elements of implementing the NQF are:

- a) it is a mechanism in linking the demand and supply of quality manpower, linking educational qualifications and working competencies;
- b) it is a mechanism and tool in equipping manpower with knowledge and skills capacities in line with market demands;
- c) it links all levels and types of education systems;
- d) it escalates and formalizes education quality and standards, leading to uniform curriculum development, with an emphasis on learner outcomes; and
- e) it is a mechanism in recognizing human values for their potential or capacities, by increasing educational opportunities, and encouraging self-learning and lifelong learning (Pichaichannarong, 2013).

Its main aim is to assist and provide national consistency for all trainers, trainees, employers, and providers, by enabling national recognition of qualifications across Thailand. The NQF has three main objectives:

- a) to provide a mechanism in linking the demands for quality manpower in industries and services with educational qualification systems;
- b) to support the policy on educational quality assurances and standards, and referencing that with international ones; and
- c) to link Thailand's NQF with the ASEAN Qualifications Reference Framework (Pichaichannarong, 2013).

9.2. Incorporating green skills into Thailand's NQF

Having an NQF strengthens and supports the national system of qualifications in Thailand by bringing together the school system and the TVET and university sectors. A key feature of the NQF is that it provides the standards for qualifications throughout Thailand. However, an essential limitation found in Thailand's NQF, and for that matter, similar qualification standards throughout the world, is that green skills or qualifications are not explicitly stated in the document.

In transitioning the Thai economy into a low-carbon, sustainable economy, the training and retraining of its people with suitable green and sustainable skills, and endowing its population with these sets of skills and qualifications, is a crucial step into moving Thailand closer to a low-carbon economy. While this process appears complicated and difficult, a model already exists in Australia that could be utilized as a roadmap towards implementation.

Australia's Green Skills Agreement (GSA) is a national agreement between the Australian Federal Government, the states, and territories. The main aim is to implement policies designed to assist the transition to a low-carbon, sustainable economy. The GSA

brings together the Australian Government and state and territory governments, employers and employees, public and private VET providers, community and adult learning providers, and the higher education sector in a spirit of collaboration to provide nationally consistent and coordinated responses to these needs. The *Green Skills Agreement* will promote the development of skills for sustainability across the VET and higher education sectors (Department of Industry, 2010, p. 3).

The GSA has four important objectives:

- a) to develop national standards in skills for sustainability within the requirements of the National Skills Framework¹² (the Australian Quality Training Framework, the Australian Qualifications Framework, and National Training Packages);
- b) "upskill" vocational education and training (VET) practitioners so they can provide effective training and facilitation in skills for sustainability;
- c) review and revise Training Packages to incorporate skills for sustainability; and
- d) implement strategies to "reskill" vulnerable workers in the transition to a low-carbon economy (Department of Industry, 2010, p. 4).

The agreement has both short- and long-term benefits. The short-term benefit is that it allows the revision of training packages to incorporate green, sustainability skills across the whole national training system. In the long term, key stakeholders such as government, businesses, and educational bodies are able to prepare, in collaboration with the workforce, to meet the future skills needs of a low-carbon economy. This also assists teaching staff to upgrade their green, sustainability skills, while students can be afforded well-articulated pathways to upgrade or obtain new qualifications. This mechanism would allow the workforce to "upskill" in a sustainable manner. In order to complete this process of skill

¹² Australia's National Skills Framework plays a similar role to Thailand's NQF.

upgrading, a nationally agreed implementation plan is required, with the input of all stakeholders, including government bodies, businesses, training organizations, and trade unions, among others. Similar measures would be of great benefit to Thailand and the ASEAN region.

Box 2
Case study

The Occupational Information (O*NET): A holistic approach to integrating competencies in the world of work

The O*NET is an extensive and comprehensive database that describes the attributes and characteristics of occupations and workers, and which can be applied in the study of labour market change. Developed by the Department of Labor in the US, its primary function was to replace the Dictionary of Occupational Titles (DOT), which was conceived in the 1930s. The resource contains valuable and detailed descriptions of the world of work, for use by job seekers, workforce development and HR professionals, students, researchers, and government and private educational institutions.

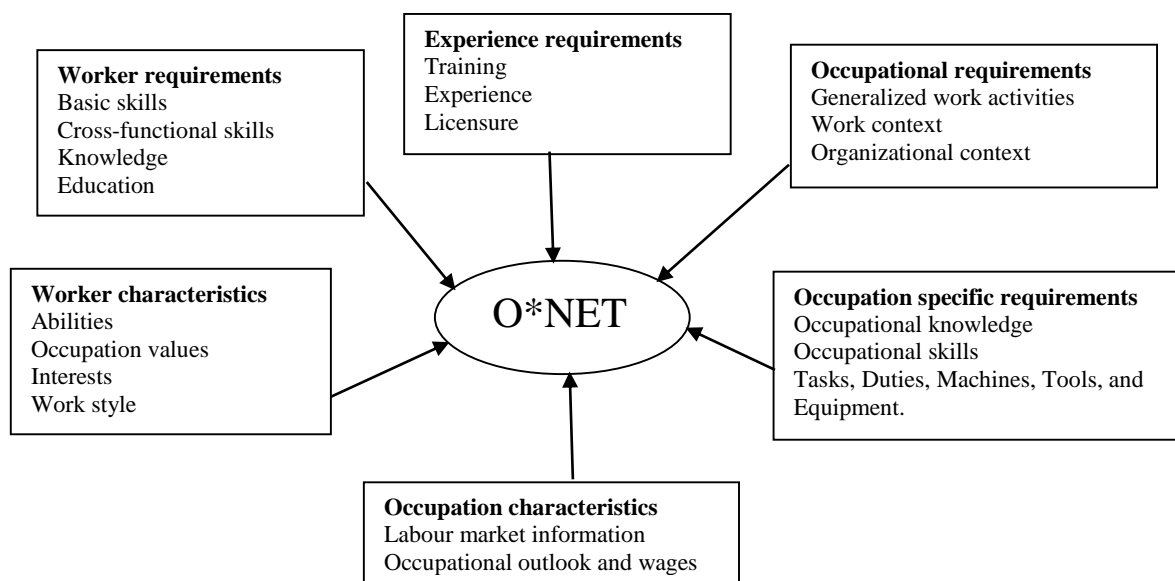
The occupational information in the O*NET is organized in a relational database that identifies, defines, and describes the comprehensive elements of job performance. A special feature of the O*NET is that it is closely linked to labour market data, which are updated on a continual basis, containing cross-occupation descriptive information that includes the kind of work, conditions under which it is done, and the requirements imposed on the people doing the work.

The O*NET takes into account the variety of applications of the information that is collected. All the occupations in the database are related to a common framework that describes job requirements and worker attributes, as well as the content and context of work, using nearly 300 descriptors for each of the 1,120 occupations, making this a very rich source of data that can be used for labour market study.

The O*NET Content Model

The Content Model is the conceptual foundation of the O*NET. It was developed by Mumford and Peterson (1995), using research on job and organizational analysis, and embodies a framework that reflects the character of occupations (i.e. using job-oriented descriptors) and people (i.e. using worker-oriented descriptors).

Figure 1. Six domains of the O*NET Content Model



Source: Mumford and Peterson (1999, p. 25, figure 3.2).

The domains are “Worker Characteristics”, “Worker Requirements”, “Experience Requirements”, “Occupational Requirements”, “Occupation Characteristics”, and “Occupation Specific Requirements”. Figure 1 summarizes each of these domains and their components. The organization of the Content Model allows the user to concentrate on relevant information that details the attributes and characteristics of jobs and workers.

The Evolution of O*NET towards a holistic approach to understanding competencies at work

Since its inception in 1999, the O*NET has been continually updated and has evolved into an “employment enhancement tool” that assists in understanding the complex nature of a continuously changing labour market. The O*NET is now a partner of the American job center network, “a product of collective thoughts and inputs ...” involving the direct input of six US government agencies including the US Department of Labor (American Job Center, 2013). A special feature of this employment enhancement tool is that it brings together the competencies, worker activities, skills, and knowledge required to perform effectively in the world of work.

Understanding the Competency Model¹³

The Careeronestop (2013) competency models have been assembled to recognize the knowledge, skills, and abilities necessary to successfully perform work duties in an industry or occupation. The Competency Model contains a “Clearinghouse” that provides the “Building Blocks for Competency Model Tools”. This tool assists in the creation of a competency model for specific industries and occupations. It is designed to provide tools that enable the creation of materials that assist businesses, educators, and workforce professionals in identifying the skills needed at work.

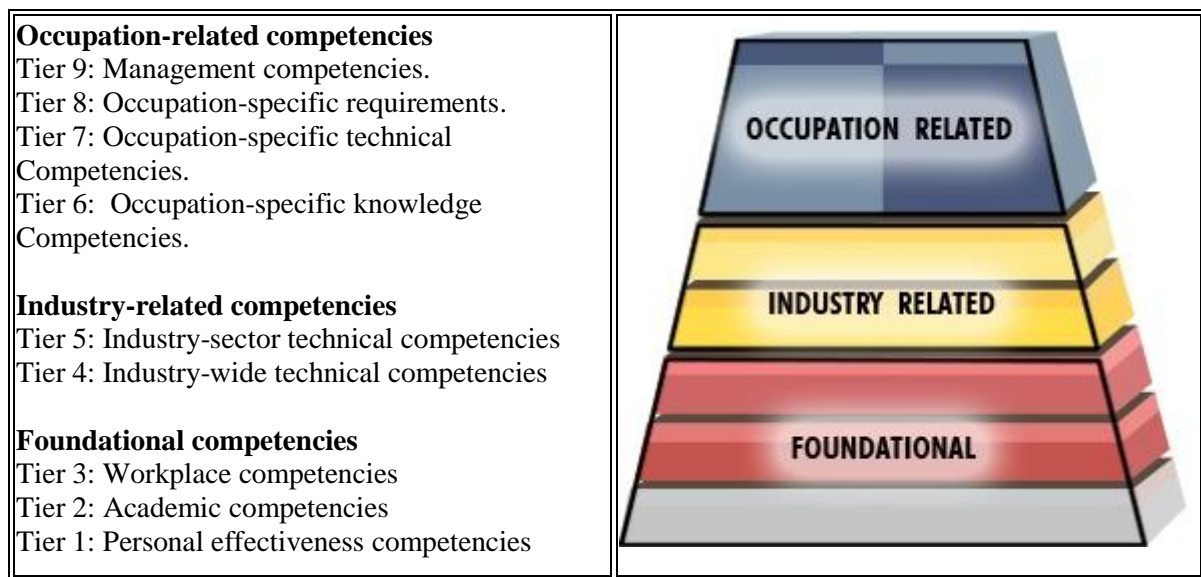
The Model’s Building Blocks

The Building Blocks for Competency Models are made up of a set of “building blocks” for competency model development. These “building blocks” are arranged in nine tiers, with each tier containing a set of related competencies. The arrangement of the tiers in a pyramid shape represents the increasing levels of specificity and specialization of content.

¹³ This section draws heavily from information obtained from the US Department of Labor, Careeronestop website available at: <http://www.careeronestop.org/CompetencyModel/CareerPathway/CPWOverview.aspx>.

The nine tiers are grouped into three categories: foundational, industry related, and occupational related competencies. At the base of the model, tiers 1 through 3 represent Foundational Competencies that provide the basis for success in school and the world of work. These competencies are essential to a large number of occupations and industries. The middle section of the model is made up of Industry Related Competencies, which consist of technical competencies. These competencies cut across industry subsectors, making it possible to create career patterns where a worker can move easily across industry subsectors. This operationalizes the concept of employability skills. A clear advantage of this system is that instead of following a restricted single occupational career pathway, this model supports the development of a flexible and adaptable workforce. At the top of the pyramid are Occupational Competencies, which consist of tiers 6, 7, 8, and 9.

Figure 2. Representation of Building Blocks for Competency Models



Source: US Department of Labor, Careeronestop, 2013.

Table 9: Industry related green building practices, residential construction

Knowledge and application of green building practices for the construction or renovation of residential buildings.

Construction Trends

- Recognize and research green building trends in the residential construction industry, including use of new materials, technologies, and processes.
- Understand the growth and impact of green building practices.
- Explain the environmental and economic benefits of green building practices.
- New methods and materials into the design and construction of residential buildings.
- Meet requirements to verify that a building project meets the highest green building and performance measures.

Siting

- Select sites well suited to take advantage of mass transit when possible.
- Protect and retain existing landscaping and natural features.
- Select plants that have low water and pesticide needs.
- Use compost and mulches.

Efficiency

- Perform home energy audits to determine the energy efficiency of a structure.
- Develop strategies to provide or increase natural lighting.
- Select sustainable construction materials and products.
- Minimize wastewater by using water conserving fixtures.

Waste management

- Follow waste management plans as per contract requirements.
- Minimize construction waste and demolition debris.
- Understand waste management terminology including: construction waste, demolition debris, land clearing debris, disposal, recycling, salvage, re-use, deconstruction, commingled, and source separation.
- Re-use or recycle materials, e.g. concrete, masonry scrap, metals, clean wood, plastics, insulation material, un-tempered glass, carpet and carpet pad, ceiling tiles, plumbing fixtures and equipment, lighting fixtures and electrical components, and cardboard packaging.

Source: Careeronestop, available at: <http://www.careeronestop.org/CompetencyModel/pyramid.aspx?CONR=Y>.

These are created to design competency-based curricula, or to articulate the requirements for an occupational credential such as a license or certification. An advantage of this model, is that the “Building Blocks for Competency Models Tool enables you to build industry competency models that can serve as the foundation for important human resource functions such as recruitment and hiring, training and development, career planning, and performance management”. It can also assist in understanding labour market change, and can provide insights into skill and knowledge requirement changes that are occurring in the labour market.

An advantage of this model is that it is flexible and usable enough in that it allows for the introduction of green competencies at the industry level. The example in table 9 above is obtained from the Residential Construction Competency Model and forms part of the middle sector of the pyramid, known as the “Industry-Sector Technical Competencies”.

10. Recommendations

Four sets of recommendations are proposed in this report: general policy recommendations; labour market recommendations; institutional capacity recommendations; and further research and data collection recommendations.

10.1 General policy recommendations

Recommendation 1

The Ministry of Labour considers that every Thai occupation is potentially a green occupation and that measures be implemented to transition them into green occupations.

Recommendation 2

The Ministry of Employment utilizes the ILO definition of “green jobs” as the baseline for green competency development in occupations in tourism and construction. This principle should be adopted for all other industry sectors.

Recommendation 3

The definition of green skills should be underpinned by the ILO principles of: preservation and restoration of environmental quality; meet the criteria of decent work; (c) involvement in direct activities of mitigation or adaptation to climate change.

Recommendation 4

For the purpose of consistency, the components of units of competency detailed in table 3 are used as a model in the preparation of green skills competencies by the DSD.

10.2 Labour market recommendations

Recommendations 1a and 1b

Create a database of green skills and occupations to gain an understanding of rapid labour market change, resulting from the emergence of new green occupations and skills.

The ISCO-08 be utilized as a frame of reference to begin to create a database of emerging green occupations, in order to transform every Thai job into a green job.

Recommendation 2

Use the experience of organizations such as the US Department of Labour (O*NET) and the ILO, which monitor the effect of green economy activities and technologies, to create a database of new green skills, in order to respond to potential green skills shortages and gaps in the Thai economy.

Recommendation 3

The effect of employment growth will cause significant skills bottlenecks in the construction and tourism sectors. As a result of this, the Ministry of Labour and other government bodies ought to take early intervention measures to prevent much higher levels of skills shortages and gaps, particularly as related to new and emerging green jobs.

Recommendation 4

The creation of a taxonomy of green skills and knowledge that are occupation specific in the tourism and construction industries, with particular attention to trade occupations such as electricians, carpenters, plumbers, tourism operators, etc.

10.3 Institutional capacity recommendations

Recommendation 1

The DSD develops green competencies for all occupations in the new skills standards. This will contribute directly to the development of a database of green skills, and will assist Thailand to transition towards a low-carbon economy.

Recommendation 2

The NQF strengthens and supports the concept of green skills in the school system and the TVET and university sectors, in order to transition the Thai economy to a low-carbon economy.

Recommendation 3

The NQF is strengthened through the implementation of a national Green Skills Agreement, by ensuring the participation of government, businesses, and community stakeholders.

10.4 Further research and data collection recommendations

Recommendation 1

Implement a pilot study to build the capacities of Thai educators to deliver green competencies at every education level.

Recommendation 2

The implementation of a research study designed to explore methods for creating a green skills database for the Thai economy.

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Appendix I: National skills standards occupations in construction and tourism

Construction occupations

Announcement of the Skills Development Promotion Committee National Skills Standards: bricklayer

According to section 22, the first paragraph of the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards for bricklayers. It has been approved by the Minister of Labour as follows:

1. “Bricklayer” is defined as a person who has knowledge, competence, and skill in bricklaying or any cube material of a similar shape for construction, decoration, and repairing, by laying them vertically. This is done using basic tools, mechanical instruments, and other relevant machine instruments. The use of tools depends on material properties, including the selection of appropriate tools and accessories for the correct performance of the task. The bricklayer is required to understand and interpret drawings, estimate, and purchase bricks. A fully trained bricklayer is capable of estimating and providing appropriate supervision in each of the three skill classes.

2. The national skills standards for bricklayers contains three skill levels:

2.1 Level 1. A bricklayer has knowledge, basic competence, and can make decisions under appropriate supervision. At this level, the bricklayer is able to conduct difficult and complex tasks under the guidance of an experienced supervisor.

2.2 Level 2. A bricklayer has knowledge and can operate a variety of tools and machinery appropriately; is able to make more complex decisions than a bricklayer at Level 1; and can work at a higher level of independence and with less supervision than at Level 1.

2.3 Level 3. A bricklayer has a high level of knowledge and competence; is able to make complex and difficult decisions; can solve complex problems; can supervise colleagues’ work quality; and is able to quickly adapt to new technologies introduced in the workplace.

3. Academic and learning specifications relate to: bricklaying knowledge benchmarks; competency levels; and work attitudes of the bricklayer.

National Skills Standards Level 1

3.1 Knowledge: the skills standards candidate must have knowledge and understanding of

3.1.1 safety issues related to:

- (1) using machines or equipment;
- (2) preventing accidents at work;
- (3) correct use of electric power tools;
- (4) correct use of chemicals;
- (5) knowledge about first aid;

- (6) correct use of fire extinguishers; and
- (7) transferring knowledge and skills on safety;

3.1.2 knowledge about work materials:

- (1) all types of brick specifications and properties;
- (2) mortar specifications and properties; and
- (3) mortar mixing ratios;

3.1.3 on-site storage and preparation;

3.1.4 tools and accessories for:

- (1) general operation of all kinds of basic tools used for bricklaying; and
- (2) maintenance and storage of tools;

3.1.5 able to add and subtract whole numbers, decimals, and fractions;

3.1.6 able to understand technical terms in bricklaying for plastering work;

3.1.7 capable of technical bricklaying with bricks and brick blocks for plastering on walls, inner angles, and wall joints; and

3.1.8 simple decoration techniques for brick walls.

3.2 The skills standards candidate must possess competency in the following:

3.2.1 selection and operation of safety equipment and accessories;

3.2.2 selection and operation of basic tools for bricklaying;

3.2.3 selection and preparation of materials for bricklaying accurately and correctly;

3.2.4 correct preparation of mortar with appropriate ratios;

3.2.5 preparation of brick wall for plastering, following specifications; and

3.2.6 inner angle bricklaying and wall joints.

3.3 Attitude and communication at work: arrive on time, honesty, appropriate social skills, follow work regulations, and use materials efficiently and economically.

National Skills Standards Level 2

3.4 Knowledge: the skills standards candidate must have knowledge, competence, and understanding of:

3.4.1 safety at the workplace;

3.4.2 correct reading and interpretation of drawings and site plans, including:

- (1) meaning of words and symbols;
- (2) meaning of drawing types and scales; and
- (3) meaning of work and materials to be used;
- 3.4.3 able to do mathematical calculations in English, including metric unit transformations, length, area, volume, surface slope, and mixed designs;
- 3.4.4 quantity interpretation and making cost estimates;
- 3.4.5 calibration and adjustment of tools and accessories for bricklaying;
- 3.4.6 secondary column and beam technique;
- 3.4.7 transportation and storage of bricks and building materials;
- 3.4.8 work cooperatively and successfully with other trades including plasterers, tilers, carpenters, electricians, plumbers, and other tradespersons;
- 3.4.9 assessment and repairing of arch bricklaying; and
- 3.4.10 installation and dismantling of scaffolding according to specifications.
- 3.5 Skill: the skills standards candidate must have knowledge, competence, and understanding of:
 - 3.5.1 operating cutting tools and machinery, following safety procedures;
 - 3.5.2 block wall laying according to specifications;
 - 3.5.3 lightweight block wall laying;
 - 3.5.4 structural brick laying for retaining walls;
 - 3.5.5 bricklaying for arches for preparing plastering work; and
 - 3.5.6 Perform bricklaying on scaffold, high-rise buildings, underground, high electric power transmission areas, and other dangerous work settings.
- 3.6 Attitude and communication at work: provides advice appropriately in situations where problem solving and analysis is required; communicates clearly and concisely with colleagues; has good analytical skills; and is able to solve complex problems.

National Skills Standards Level 3

- 3.7 Knowledge: the skills standards candidate must possess knowledge and understanding of:
 - 3.7.1 construction and safety standards;
 - 3.7.2 bricklaying plans;
 - 3.7.3 construction drawing interpretation in cross section according to standards and specifications;

3.7.4 able to carry out geometrical and other mathematical computations; and

3.7.5 able to carry out cost estimations.

3.8 Skills: the skills standards candidate must be competent in:

3.8.1 reading draughtsman's drawings;

3.8.2 assessing quality of bricklaying;

3.8.3 mixing mortar using appropriate machinery;

3.8.4 laying brick arches according to architectural specifications;

3.8.5 glass block laying; and

3.8.6 multiple colored bricklaying.

3.9 Attitude and communication at work: able to present and explain ideas presented in drawing specifications, and ability to problem solve on the work site.

Approved by the Skills Development Promotion Committee on 23 June 2011.

Announcement of the Skills Development Promotion Committee

National Skills Standards: computer-aided designer

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards for computer-aided designers, granted by the Minister of Labour as follows:

1. This announcement states that computer-aided designers are those having knowledge, competence, and skill in drawing plans of constructions with basic tools and equipment, and computers, as assigned by the supervisor, engineers, and architects. They shall have skills and knowledge in computer-aided design for each step of drawing, and shall work on related materials.

2. Based on the national skills standard, the skills for computer-aided design can be classified into three levels as follows:

2.1 Level 1. Includes those who have basic knowledge and can make decisions with some advice from the supervisor. They can inspect important issues as needed.

2.2 Level 2. Includes those who have higher knowledge and skills in using tools and equipment than those in Level 1. They still need advice, and the job quality is higher than Level 1.

2.3 Level 3. Includes those who have high knowledge and skills in trouble shooting, and can give advice to co-workers. They shall also apply their knowledge with new technologies.

3. Academic specification used as a standard or criteria of the knowledge, competence, and attitude for computer-aided designers.

National Skills Standards Level 1

3.1 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.1.1 plan drawings:

- (1) standards on plan drawings, including letters, lines, symbols, and technical terms in the fields of construction, architecture and structures;
- (2) plan layout, title frame of construction plans, types and sizes of plans, with proper scales and plan folding;
- (3) filing of construction plans and indexing; and
- (4) geometrical pictures;

3.1.2 materials, tools, equipment, and applications for plan drawings:

- (1) types, sizes, uses, maintenance, and keeping of basic tools and equipment for plan drawings;
- (2) components, uses, and maintenance of personal computers and printers;
- (3) uses of applications –

- (a) menu of drawings and modification of two-dimensional pictures;
- (b) building and uses of layer; and
- (c) uses of blocks or symbols from library;

3.1.3 knowledge of construction:

- (1) basic construction materials in terms of quality and uses; and
- (2) wood and concrete structures in construction.

3.1.4 Other fields of knowledge:

- (1) basic English for technicians mathematics and geometry;
- (2) operating systems of computers; and
- (3) safety –
 - a) prevention from possible accidents caused by electricity, chemicals, fires on site, and first aid; and
 - b) health.

3.2 Skills: the skills standards applicant must have competence in:

3.2.1 preparing materials, tools, and equipment:

- (1) selection of recording equipment;
- (2) use of personal computers; and
- (3) selection of printers;

3.2.2 using applications to create two-dimensional pictures as assigned by engineers and architects;

3.2.3 other skills:

- (1) using basic computer programs for filing efficiently;
- (2) providing personal working schedules and following them efficiently; and
- (3) providing a materials list for each plan.

3.3 Attitude includes punctuality, discipline, integrity, and frugality.

National Skills Standards Level 2

3.4 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.4.1 safety:

- (1) use of personal and general safety tools and equipment; and

- (2) first aid;

3.4.2 planning for drawings and following the plan;

3.4.3 knowledge of plan drawings for reinforced concrete buildings:

- (1) architectural structures;
- (2) engineering works, including structures and systems;
- (3) different standards for plan drawings – for example, fonts and layers; and
- (4) references (projected plans);

3.4.4 materials, tools, equipment, and applications for plan drawings:

- (1) selection and use of connectors;
- (2) components and uses of computer networks in the office;
- (3) techniques and uses of computers;
- (4) uses of applications;
- (5) uses of Layer;
- (6) filing of construction plans and Blocks or Symbols data;
- (7) uses of Customization; and
- (8) printing based on scales;

3.4.5 knowledge of construction:

- (1) construction material and equipment in terms of qualities and uses; and
- (2) principles of construction work, processes, and techniques in wood and reinforced structures;

3.4.6 other fields of knowledge:

- (1) English for technicians, intermediate level;
- (2) physics;
- (3) computer programs – for example, Word Processor, Spread Sheet, and Presentation (PowerPoint);
- (4) general estimation of construction materials to be used;
- (5) safety on site;

- (6) municipal regulations on construction; and
- (7) classification of materials and equipment.

3.5 Skills include:

3.5.1 preparation of materials, tools, and equipment for working:

- (1) selection and preparation of drawing papers used with printers;
- (2) selection and changing of ink cartridges for different printers; and
- (3) selection and uses of data back-up systems;

3.5.2 uses of applications for plan drawings:

- (1) architectural plans;
- (2) building structure plans; and
- (3) building system plans;

3.5.3 estimation of construction materials.

3.6 Attitude includes knowledge development, work analysis, trouble shooting, and advice to co-workers.

National Skills Standards Level 3

3.7 knowledge includes:

3.7.1 providing a working schedule and estimating the cost of plans;

3.7.2 estimating construction costs and expenses;

3.7.3 knowledge of plan drawings for buildings with special, complicated structures and public works:

- (1) structural systems;
- (2) mechanical systems; and
- (3) infrastructural system;

3.7.4 materials, tools, equipment, and different applications for plan drawings;

3.7.5 materials, tools, equipment, and uses of computer networks;

3.7.6 uses of applications for plan drawings:

- (1) building and modifying three-dimensional pictures;
- (2) providing standards for plan drawings;

- (3) estimating the amount of materials needed, by three-dimensional pictures;
- (4) adjusting the configuration; and
- (5) inspecting the correctness of plans drawn;

3.7.7 knowledge of construction:

- (1) specifications and details of construction materials, iron structures, and special, mechanical and infrastructural structures; and
- (2) construction working systems, including iron and special structures;

3.7.8 other fields of knowledge:

- (1) installation and uses of computer connectors;
- (2) standards on construction and related engineering works – for instances, acts on buildings and constructions, etc.;
- (3) English for technicians; and
- (4) evaluation forms.

3.8 Skills:

3.8.1 preparation of materials, tools, and equipment for working:

- (1) proper uses of computer networks;
- (2) hard disk preparation; and
- (3) data back-ups;

3.8.2 uses of different applications for plan drawings:

- (1) civil work plans;
- (2) projected plans with details; and
- (3) three-dimensional pictures with details of materials, colours, and lights.

3.9 Attitudes include efficient analysis, trouble-shooting, and solutions.

Announced on 15 October 2012.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: plasterer

According to section 22, first paragraph of the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards for plasterer. It has been approved by the Minister of Labour as follows:

1. Upon this notification, a plasterer is a person who has knowledge, competency, and skill in plastering, coating, making up, and designing trim; repairing pasting, selecting and preparing accessories appropriate to task requirements, drawing, reading, estimation, work planning, and supervising all appropriate tasks.

2. National Skills Standards for plasterers consists of three skills levels:

2.1 Level 1. A plasterer has knowledge, basic competence, and can make decisions under appropriate supervision. At this level, the plasterer is able to conduct difficult and complex tasks under the guidance of an experienced supervisor.

2.2 Level 2. A plasterer has knowledge of, and can appropriately operate, a variety of tools and machinery; is able to make more complex decisions than a plasterer at Level 1; and can work at a higher level of independence and with less supervision than at Level 1.

2.3 Level 3. A plasterer has a high level of knowledge and competence; is able to make complex and difficult decisions; can solve complex problems; can supervise colleagues' work quality; and is able to quickly adapt to new technologies introduced in the workplace.

National Skills Standards Level 1

3.1 Knowledge: the skills standards candidate must have knowledge and understanding of:

3.1.1 safety, including:

- (1) using machinery or equipment;
- (2) preventing accidents at work;
- (3) correct use of electric power tools;
- (4) correct use of chemicals;
- (5) knowledge about first aid;
- (6) correct use of fire extinguishers; and
- (7) transferring knowledge and skills on safety;

3.1.2 material:

- (1) characteristics and properties of material for plastering;
- (2) mortar mixing ratios; and
- (3) correct usage of each type of plaster.

3.1.3 Storage and preparation of materials:

- (1) general operation of all kinds of basic tools used for plastering; and
- (2) maintenance and storage of tools;

3.1.5 able to add and subtract whole numbers, decimals, and fractions;

3.1.6 technical terms in English related to plastering;

3.1.7 plastering techniques:

- (1) preparing any surface area for plastering;
- (2) plaster mortar mixing according to specifications;
- (3) plastering procedures specified by vertical margin, offset, length, rendering and alignment, level fringe, end edging, primary coating, and surface plastering and rendering; and
- (4) plaster coating for top surfaces such as tiling, terrazzo work, etc.

3.2 Skills: the skills standards candidate must have competency in the following:

- 3.2.1 handling material and mixing ratios to specifications or specified work requirements;
- 3.2.2 properly operating and providing tools, materials, and accessories;
- 3.2.3 using personal protection equipment;
- 3.2.4 preparing working areas and surfaces for plastering;
- 3.2.5 plastering techniques including vertical margin, offset, length, rendering and alignment, level fringe, end edging, primary coating, and surface plastering and rendering.
- 3.2.6 preparing surface plastering for different top materials;
- 3.2.7 storage and carrying of raw materials, tools, and accessories; and
- 3.2.8 inspecting and maintaining instruments and accessories.

3.3 Attitude: arrive at work on time, work according to regulations, honesty, and frugality with materials.

National Skills Standards Level 2

3.4 Knowledge: the skills standards candidate must have knowledge and understanding of:

- 3.4.1 safety performance on site;
- 3.4.2 drawings:
 - (1) meanings of words and symbols;

- (2) types of drawings and scale; and
- (3) specifications of work and material;
- 3.4.3 calculation in English, and metric unit transformation, including length, area, volume, surface slope, and mixed design;
- 3.4.4 quantity estimations and making correct lists of materials;
- 3.4.5 finish plastering surface, touch and pull pattern, splashing pattern, and surface decoration;
- 3.4.6 make up trim and set up finishing trim;
- 3.4.7 plaster angle recesses;
- 3.4.8 inspection and repair of surface plastering; ad
- 3.4.9 work cooperatively with other trades including bricklayers, tilers, carpenters, electricians, and plumbers.
- 3.5 Skills: the skills standards candidate must have knowledge, competence, and understanding of:
 - 3.5.1 drawing specifications;
 - 3.5.2 making lists of materials required for work to be completed;
 - 3.5.3 finish plastering surface, touch and pull patterns, splashing patterns; surface decorations.
 - 3.5.4 plastering the bottom of beams, and ceilings;
 - 3.5.5 make up trim and set up finishing trims; and
 - 3.5.6 plastering angle recess patterns.
- 3.6 Attitude: provides advice in situations where problem-solving and analysis is required; communicates clearly and concisely with colleagues; has good analytical skills and is able to solve complex problems.
- 3.7 Knowledge: the skills standards candidate must be competent in:
 - 3.7.1 construction safety standards;
 - 3.7.2 able to carry out cost estimations;
 - 3.7.3 able to interpret drawings and site plans according to standards and specifications;
 - 3.7.4 arranging time schedules for plastering;
 - 3.7.5 trim techniques, pattern decorations, and round edging;

3.7.6 plaster spraying techniques using spraying machines; and

3.7.7 plastering on different kind of surfaces.

3.8 Skills: the skills standards candidate must be competent in:

3.8.1 estimation of material quantities, costing of labour and materials, work schedules, expenditures, and preparation of tendering documents;

3.8.2 understanding of drawing specifications;

3.8.3 plastering schedules on construction sites;

3.8.4 applying different plastering techniques on different wall surfaces;

3.8.5 assigning, inspecting, and evaluating plastering projects; and

3.8.6 plaster spraying techniques using spraying machines.

3.9 Attitude: able to present and explain ideas presented in drawing specifications, and ability to problem-solve on work sites.

Approved by the Skills Development Promotion Committee on 23 June 2011.

Announcement of the Skills Development Promotion Committee

National Skills Standards: concrete tile roofers

According to section 22, first paragraph, of the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards for concrete tile roofers, granted by the Minister of Labour as follows:

1. Concrete tile roofers are those who have knowledge, competence, and skill in roofing concrete tiles, based on the standard industry tiles. They shall have the skill of using different tools and equipment for roofing. Roofing covers the following work: reading and drafting drawings, estimating costs from drawings, and planning and inspection of details – for example, slopes, levels, and roof angles etc. They shall also have the knowledge of installing the following items: purlins, insulating boards, hip rafters, valley rafters, and hips, etc., and of supervising working schedules, analysing and solving roofing problems, giving advice to co-workers, and inspecting the quality of work before completing the job.

2. Based on the national skills standards, the skills in roofing can be classified into three levels as follows:

2.1 Level 1. Includes those who work as roofing assistants and have basic knowledge and skills on roofing standards, using roofing tools and equipment, transferring materials needed for roofing, and mortar ratios. This work is conducted under the supervision of roofing masters.

2.2 Level 2. Includes those who are roofers and have higher knowledge, competence, and skills than those in Level 1. Their job descriptions include reading and drafting drawings, and inspection of details – for example, slopes, levels, and angles, etc. They shall also have knowledge of installing the following items: purlins, insulating boards, hip rafters, valley rafters, and hips etc. They can give advice on tools and equipment to be used. They can also make better work decisions than Level 1, under the supervision of their immediate line managers.

2.3 Level 3. Includes those who work as supervisors and have higher knowledge, competence, and skill in analysis and solving problems than those at Level 2. They can also read, draft, and correct drawings, and can calculate and estimate materials, tools, and equipment for roofing. They give advice to co-workers, supervise, inspect the quality of roofing, and report to the contractor before handing over a given job.

3. Academic specifications used as a standard or criteria of the knowledge, competence, and attitude for concrete tile roofers.

National Skills Standards Level 1

3.1 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.1.1 use and maintenance of measuring, cutting, and drilling tools and equipment;

3.1.2 selection of materials, tools, and equipment for roofing;

3.1.3 lifting and transferring materials, tools, and equipment for roofing, correctly and safely;

3.1.4 standards for transferring and moving roofing materials before going up to the roof;

- 3.1.5 standards for piling tiles and other materials on the roof;
- 3.1.6 roofing and installing basic tools and equipment;
- 3.1.7 mortar ratio for installing ridge tiles;
- 3.1.8 painting under the ridge tiles, tile rims, nails, and cover sheets; and
- 3.1.9 safety on:
 - (1) working in high places;
 - (2) using electric power;
 - (3) first aid; and
 - (4) private safety tools.

3.2 Skills: the skills standards applicant must have competence in the following:

- 3.2.1 using, maintaining, measuring, cutting, and drilling equipment properly;
- 3.2.2 using and maintaining private safety tools correctly;
- 3.2.3 using and moving tools and equipment for roofing, properly and correctly;
- 3.2.4 moving roofing materials up and down the roof properly and safely, both for the roofers and materials handlers;
- 3.2.5 measuring and cutting roofing materials, and installing basic instruments;
- 3.2.6 mortar ratio for installing ridge tiles properly; and
- 3.2.7 painting under ridge tiles, tile rims, nails, and covers.

3.3 Arrive on time, honesty, appropriate social skills, follow work regulations, and use materials efficiently and economically.

National Skills Standards Level 2

3.4 Knowledge: the skills standards applicant must have knowledge and understanding of:

- 3.4.1 reading drawings and their details with respect to the roof and its components;
- 3.4.2 specifications of different kinds of roof weights;
- 3.4.3 specifications of roof tiles and battens;
- 3.4.4 techniques on measuring the pitch of the roof;
- 3.4.5 techniques for measuring the space of each tile batten;
- 3.4.6 standards on installation of soffits and toothed lath for different tiles;

- 3.4.7 standards on uses and installation of roof valleys;
- 3.4.8 standards on reinforced concrete wings;
- 3.4.9 specifications and standards on installation of insulating boards;
- 3.4.10 standards on roofing different types of concrete tiles;
- 3.4.11 use of tools, equipment, and machinery for roofing;
- 3.4.12 standards on attaching different types of tiles;
- 3.4.13 standards on installation of ridge tiles and hip rafters for both dry and mortar systems;
- 3.4.14 standards on installation of hips and toothed laths for different types of tiles;
- 3.4.15 standards on installation of cover sheets;
- 3.4.16 selection of suitable sites for transferring tiles up and down the roof; and
- 3.4.17 basic knowledge of mathematics.

3.5 Skills include:

- 3.5.1 reading and drafting drawings;
- 3.5.2 inspecting the roof before roofing:
 - (1) the strength of the roof structure, and the joints in particular;
 - (2) minimum pitch of the roof;
 - (3) purlin spaces and jointed purlins, and giving advice for any corrections needed;
 - (4) soffits and toothed lath, and giving advice for any corrections needed;
 - (5) the roof valley, and giving advice for any corrections needed;
 - (6) the reinforced concrete wings, and giving advice for any corrections needed;
 - (7) installation of tiles and ridge tiles, properly based on the manufacturing standard; and
 - (8) installation of roof materials and equipment, properly based on the manufacturing standard.

3.6 Arrive on time, honesty, appropriate social skills, follow work regulations, and use materials efficiently and economically.

National Skills Standards Level 3

3.7 Knowledge includes:

- 3.7.1 standards of products and their specifications;
- 3.7.2 basic knowledge of mathematics and geometry;
- 3.7.3 drafting roof drawings;
- 3.7.4 estimating roof materials, other materials, and wages;
- 3.7.5 efficient communication;
- 3.7.6 good planning and making control charts;
- 3.7.7 effective and efficient supervision; and
- 3.7.8 standards on roof quality controls.

3.8 Skills:

- 3.8.1 inspection of the specification of materials used in roofing, and drafting roof Drawings;
- 3.8.2 safety for roofing;
- 3.8.3 preparing suitable on-site places for laying materials;
- 3.8.4 inspection of materials delivered to the site in terms of types and amounts;
- 3.8.5 planning and supervising roofing works as planned;
- 3.8.6 coordinating and making reports to the employers or site managers;
- 3.8.7 giving advice for any correction based on the standards provided; and
- 3.8.8 inspection of the finished work before presenting the work to the customer.

- 3.9 Attitudes include planning, analysing, and providing solutions during roofing, in light of efficiency, quality, and finished product.

Announced on 12 March 2009.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: construction carpenters

According to section 22, first paragraph, Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards for construction carpenters, granted by the Minister of Labour as follows:

1. Construction carpenters are those who have knowledge, competence, and skills in construction with wood – for example, shutter boards, building structures, roof structures, floors, doors, windows, stairs, working platforms, and walls, with basic and mechanical tools, equipment, and machinery. They shall have knowledge in selecting materials and instruments; understanding and drafting of drawings; and estimating and supervising floors, as assigned.

2. Based on the national skills standards, the skills of construction carpenter can be classified into three levels as follows:

- 2.1 Level 1. Includes those who have basic knowledge and skills. They can make some decisions with the help of their supervisors, but supervision is always needed for important cases.
- 2.2 Level 2. Includes those who have higher knowledge, competence, and skills using tools. They can also make better decisions than Level 1, with some advice. The quality of work is better than at Level 1.
- 2.3 Level 3. Includes those who have higher knowledge, competence, and skills in analysis and solving problems. They can also give advice to co-workers and can apply their knowledge to new technologies.

3. Academic specification used as a standard or criteria of the knowledge, competence, and attitude for carpenters.

National Skills Standards Level 1

3.1 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.1.1 safety, including:

- (1) basic safety rules;
- (2) use of materials, tools, and equipment;
- (3) use and wearing of private safety gowns and tools;
- (4) cleaning and maintaining the site;
- (5) first aid kit;
- (6) precautions on use of electrical appliances; and
- (7) moving heavy materials;

3.1.2 mathematics for technicians:

- (1) calculation of figures, decimals, fragments for length, width, angles, space, volume, and weight; and

- (2) geometry and trigonometry;

3.1.3 materials:

- (1) types, qualifications, drying method, and piling of processed woods and synthetic woods;
- (2) types, qualifications, sizes, and methods of use for fasteners and glues; and
- (3) types and sizes of wood for building structures;

3.1.4 tools and equipment:

- (1) use and maintenance of different measuring tools – distant, vertical, horizontal;
- (2) use and maintenance of basic tools;
- (3) use and maintenance of mechanical tools – for example, drills, planes, saws; and
- (4) modifications to sharp tools and equipment, and maintenance;

3.1.5 construction drawings:

- (1) reading construction drawings and their specifications and details; and
- (2) types and use of tools and equipment for drawing;

3.1.6 concrete shutter boards:

- (1) types and components of concrete shutter boards;
- (2) identification of concrete types; and
- (3) principles and process of building shutter boards –
 - a) foundations;
 - b) beams; and
 - c) floor on the beam;

3.1.7 wood structure of buildings:

- (1) columns, beams, and ribs;
- (2) components and functions; and
- (3) materials, tools, and equipment;

3.1.8 pointing sill system:

- (1) components and functions; and

- (2) materials, tools, and equipment;

3.1.9 roof structures:

- (1) different roof shapes;
- (2) single roofs; and
- (3) measuring methods for sizes and angles of rafters;

3.1.10 roofing:

- (1) materials, tools, and instruments; and
- (2) relationship between roofing materials, slopes, and climates;

3.1.11 flooring:

- (1) floor materials;
- (2) wood flooring and nail hiding; and
- (3) wood preparation for flooring;

3.1.12 walls:

- (1) outer wall – uses, components, materials, and instalments; attachment to other components of buildings; calculations of horizontal and vertical lines and surfaces for normal openings;
- (2) internal wall – uses, components, materials and instalments, attachment to other components of buildings, calculations of horizontal, vertical lines and surface and openings; and
- (3) materials and installation of beading, skirting, and fillet.

3.2 Skills include:

3.2.1 safety:

- (1) strict observation of safety measures and prevention of dangers;
- (2) operation of first aid for cuts, burns, electrocution, and other minor injuries; and
- (3) use of proper fire extinguishers;

3.2.2 selection of materials, tools, and equipment:

- (1) woods;
- (2) wood products – for examples, plywood, joints, and other synthetic woods;
- (3) fasteners – for examples, nails, screws, bolts, and nuts; and

(4) hinges, hands, keys, beadings, and skirts;

3.2.3 selection, use, sharpening, and maintenance of tools and equipment:

(1) basic;

(2) measuring;

(3) sharp; and

(4) other tools and equipment: heavy hammers, jacks, crowbar, and shovels, etc.;

3.2.4 preparation for the correct job as specified in the drawing:

(1) making clear all details and planning;

(2) marking, and specifying wood pieces for assembling as specified in the drawings and attachments; and

(3) drafting the drawings of jobs assigned;

3.2.5 measuring and setting out for making the roof structure;

3.2.6 single roof:

(1) determining and levelling from the referential point to:

a) upper and lower shallow foundation and foundation posts;

b) the surface and underground beams; and

c) the thickness of floors and finishing layer;

3.2.7 shutter boards:

(1) assembling and installing shutter boards;

(2) beams, columns, floors, and ladders; and

(3) removal of boards, and cleaning and piling boards properly and safely.

3.2.8 installation of floor sheet, walls, and ceilings:

(1) installing wooden floor sheets or finished floor sheets;

(2) installing inner and outer walls with synthetic sheets or other simple materials;

(3) installing the synthetic sheets or other materials to the ceiling on one plane; and

(4) installing the synthetic sheets or other materials to the ceiling on layered planes.

3.3 Attitudes include on-time operation, discipline, honesty, and economy.

National Skills Standards Level 2

3.4 Knowledge on:

- (1) safety at work, occupational health and safety, and environment; and
- (2) mathematics for work plans, adjacent angles, ovals, and parabolic and horseshoe curves.

3.4.3 tools and equipment:

- (1) types and uses of chemicals for wood protection and preservation;
- (2) inspecting and selecting woods properly, both for permanent and temporary wood structures;
- (3) use of hinges, latches, screw notches, etc.; and
- (4) use of decorative covers and chemicals for coating and decoration;

3.4.4 types and use of machinery, and maintenance;

3.4.5 reading and understanding wood works in drawings;

3.4.6 site plans:

- (1) setting out;
- (2) the referential point; and
- (3) the post centre;

3.4.7 principles and methods of assembling shutter boards:

- (1) columns;
- (2) beams; and
- (3) floors above the ground;

3.4.8 wood structure of buildings:

- (1) methods of cutting, joining, assembling, and installing columns, beams, and wall joists; and
- (2) methods of cutting, joining, assembling, and installing pointing sill;

3.4.9 roof structure:

- (1) the structure of lapped roofs;

- (2) methods of structuring roofs;
- (3) roofing types, assembling roofs, and use of adhesives; and
- (4) installation of toothed laths and soffits;

3.4.10 roofing:

- (1) roofing methods for different materials;
- (2) types of insulating boards and openings;
- (3) causes and prevention of draining leaks; and
- (4) methods of leak sealing;

3.4.11 stairs:

- (1) different stairs and their components;
- (2) precautions;
- (3) distance between treads and risers, landing, and balustrade;
- (4) assembling head posts, balusters, and joining different balustrades; and
- (5) calculation of distances necessary for stairs;

3.4.12 ceiling uses, components, and installation and attachment to other parts, and determining vertical and horizontal distances and openings;

3.4.13 doors and windows:

- (1) characteristics and quality of door and window types;
- (2) measuring, selection, and methods of joints for doors and windows;
- (3) assembling and installation of door and window jambs;
- (4) installation of doors and windows;
- (5) tools and equipment for doors and windows;
- (6) different types of beadings and skirting boards; and
- (7) different square patterns on doors;

3.4.14 working platforms:

- (1) components of different working platforms –
 - a) bamboo;
 - b) processed woods; and
 - c) metals;
- (2) materials, tools, and equipment for installing different working platforms; and
- (3) methods of installation, precautions, and safety tools for installation and removal of working platforms;

3.4.15 other fields of knowledge:

- (1) understanding of basic water pipes and sanitary works, metal works, electrical systems, tiling, plastering, and safety; and
- (2) English technical terms.

3.5 Skills include:

3.5.1. selection and use of different materials:

- (1) paints and chemicals for wood preservation; and
- (2) adhesives;

3.5.2 selection, use, sharpening, and maintenance of tools, equipment, and machinery for carpentry – for example, drills, sharpening machines, skirting board removers, and saws, etc.

3.5.3 plans and their details:

- (1) projecting the wood structure plans with proper scales; and
- (2) comments and advice on plans made by architects, for prevention of possible problems;

3.5.4 measuring and determining positions:

- (1) setting out for lapped roofs;
- (2) setting out for staircases;
- (3) simple staircases;
- (4) staircases with landings; and
- (5) winding staircases;

3.5.5 determining positions in the construction plan:

- (1) determining the building position according to the site plan;

- (2) determining different points of the building;
- (3) determining the centre of posts and the correct depth level of holes; and
- (4) inspecting the line, width, length, and depth level of holes;

3.5.6 shutter boards, round posts, winding stairs, stairs with landings, curving walls, and simple pentagonal and hexagonal shapes;

3.5.7 structures, posts, beams, floors, and ceilings of wood buildings

- (1) building and assembling the whole structure with posts, beams, and wall joists;
- (2) assembling the wall joists, floors, and openings;
- (3) assembling non-supporting walls and openings; and
- (4) assembling the ceiling structure;

3.5.8 roof structure:

- (1) assembling and installing rafters, purlins, and laths according to the manufacturing standard;
- (2) installing insulating boards at the roof and outer wall;
- (3) assembling a single roof structure; and
- (4) assembling a lapped roof;

3.5.9 installation of floor sheets, walls, and ceilings:

- (1) installing inner and outer walls with processed woods or other materials, which requires higher skills; and
- (2) installing beading and skirts;

3.5.10 working platforms:

- (1) assembling and installing elevated floors and low working platforms;
- (2) assembling and installing bamboo scaffolding for construction of two-storey buildings; and
- (3) removal, cleaning, and piling of scaffolding properly; and

3.5.11 other skills include installing partitioning walls made of gypsum boards, joint woods, and hard boards with wood or aluminium frames.

3.6 Attitude includes skills and knowledge development, analysis, decisiveness and pro-activeness, and advice to subordinates.

National Skills Standards Level 3

3.7 Knowledge of:

3.7.1 wood drying and forming;

3.7.2 modifications to equipment and blades in machinery, and maintenance;

3.7.3 roof structures:

(1) roof trusses;

(2) dome buildings; and

(3) trusses for different roof shapes;

3.7.4 working platforms, work plans, storing, and maintenance on site;

3.7.5 other knowledge:

(1) determining horizontal, vertical, and perpendicular lines of building components;

(2) laws and municipal regulations for construction; and

(3) SME businesses.

3.8 Skills include:

3.8.1 selection of different insulating boards;

3.8.2 selection, use, sharpening, and maintaining carpentry machinery – for example, saws, circular saws, shapers, planers, jointers, radial arms, and saws, etc.;

3.8.3 measuring and determining positions:

(1) determining angles, horizontal and sloping levels of different building shapes, and different arches – for example, circles, semi-circles, crescents, onion domes, gothic arches, U-shaped arches, and three-centred arches, etc.; and

(2) setting out for truss-making;

3.8.4 shutter boards: installing shutter boards for round columns, winding stairs, stairs with landings, and curved, pentagonal, and hexagonal walls, which require higher skills;

3.8.5 building, assembling, and installing pointing sill and openings;

3.8.6 roof structure:

(1) assembling and installing trusses; and

(2) assembling and installing dome roofs;

3.8.7 building and installing doors and windows:

- (1) building and modifying jambs for different doors and windows;
- (2) building and modifying doors, windows, and square patterns on doors;
- (3) installing finished different doors – for example, swinging, sliding, and
- (4) folding doors, and hinges, doorknobs, and locks; and
- (5) installing finished wood windows, hinges, and locks;

3.8.8 stairs:

- (1) figuring the size of treads and risers and the length of steps;
- (2) setting out the stairs and determining the position of outer strings; and
- (3) building and installing single stairs, stairs with a landing, and one-fourth, one-second, three-fourths, and winding stairs; and

3.8.9 other skills:

- (1) estimating expenses and the price of a whole project; and
- (2) writing a report of work done.

3.9 Attitudes include the analysis of working plans, and solutions for efficiency.

Announced on 20 July 2011

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: painter

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has specified the national skills standards, for painters for decoration, granted by the Minister of Labour as follows:

1. Painters are those who have knowledge, competence, and skill in painting for decoration, and they shall have skills in preparing different surfaces – for example, cement, wood, metal, and synthetic surfaces. Other skills cover priming, coating, decorating walls, and selecting materials, tools, and equipment correctly. They shall maintain tools and equipment and the installation of working platforms properly, for the safety of all workers.

2. Based on the national skills standards, the skills in painting for decoration can be classified into three levels as follows:

2.1 Level 1 includes those who have basic knowledge and skills, but who need advice from supervisors, if necessary.

2.2 Level 2 includes those who have intermediate knowledge and skills in using tools and equipment properly, and experience, and they can give advice to subordinates.

2.3 Level 3 includes those who have high skills and can analyse and trouble-shoot. They know the process of painting and can use manuals and apply new technologies to improve work outcomes.

3. Academic specification used as a standard or criteria of the knowledge, competence, and attitude for concrete tile roofers.

National Skills Standards Level 1

3.1 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.1.1 safety on site, and the environment:

- (1) rules for painters;
- (2) safe and sound workplaces;
- (3) use and care of fire distinguishers;
- (4) inflammable substances and precautions against fire;
- (5) sealed containers for inflammable materials;
- (6) labelling and keeping inflammable materials in safe places;
- (7) health protection from dangerous materials;
- (8) first aid; and
- (9) destroying and disposing of dangerous materials properly;

3.1.2 basic knowledge of materials, tools, and equipment, including:

- (1) maintenance of basic materials, tools, and equipment for painting;
- (2) types of paints and thinners; and
- (3) qualifications and proper use of ladders and working platforms;

3.1.3 basic skills in working:

- (1) preparation of different surfaces – for example, wood, metal, cement, and synthetic materials;
- (2) priming of different surfaces – for example, wood, metal, cement, and synthetic materials; and
- (3) painting different surfaces – for example, wood, metal, cement, and synthetic materials.

3.2 Skills: the skills standards applicant must have competence in:

3.2.1 safety for workers, and the workplace and environment:

- (1) observing the safety rules in the workplace – for example, fire extinguishing, following safety signs, and first aid;
- (2) protection from dangerous inhalants; and
- (3) maintenance of safety tools and equipment;

3.2.2 maintenance of paint, materials, and equipment:

- (1) cleaning paint brushes used with oil and water paints;
- (2) maintaining paint tools and equipment;
- (3) cleaning and maintaining painting equipment;
- (4) keeping different types of paint materials properly;
- (5) selecting proper solvents for cleaning paint brushes;

3.2.3 preparation of surfaces for painting:

- (1) scraping old paint; and
- (2) filling;

3.2.4 priming and sanding;

3.2.5 painting;

3.2.6 observation of orders:

- (1) taking up, going over, and observing orders; and
- (2) reporting or recording results;

3.2.7 selection of paints for decoration:

- (1) proportion of mixtures; and
- (2) paints for different surfaces.

3.3 Attitude includes being on time, being disciplined, honest, and economical.

National Skills Standards Level 2

3.4 Knowledge: the skills standards applicant must have knowledge and understanding of:

3.4.1 safety for workers, workplace, and environment:

- (1) dangerous paints and mixing materials;
- (2) different types of inflammable materials;
- (3) safety tools and equipment – for example, gloves, shoes, and glasses;
- (4) proper storing of inflammable materials; and
- (5) precautions regarding tools and equipment that can cause fire;

3.4.2 selection of materials, tools, and equipment:

- (1) proper selection of paint materials and paint mixing materials;
- (2) paintbrushes, brushes, paint rollers, and spray guns;
- (3) suitable tools and equipment for different types of paint work; and
- (4) proper selection of ladders and working platforms;

3.4.3 specification for paints and work:

- (1) proper selection of paint materials and paint mixing materials;
- (2) specification of paints, gloss finishes, and varnishes for different work;
- (3) specifying the areas to be painted;
- (4) specifying the amounts of materials to be used;
- (5) specifying different parts of the building to be painted – for example, skirting boards, stairs, and jambs;

3.4.4 schedules:

- (1) following painting schedule;

- (2) precautions in each step of work;
- (3) details of work desired;
- (4) details of patterns to be painted; and
- (5) projecting patterns based on correct scales.

3.5 Skills include:

3.5.1 safety for workers, workplaces, and environment:

- (1) observing safety rules – for example, first aid for those inhaling inhalants, and extinguishing fires caused by oils and inhalants, and fire on clothes;
- (2) inhaling dusts, sprays, and inhalants; and
- (3) maintaining safety tools;

3.5.2 selection and maintenance of painting tools and equipment:

- (1) proper cleaning, maintaining, and storing of spraying tools;
- (2) proper selection of paintbrushes for different work; and
- (3) proper selection of spraying tools, pressure injectors, and paint tins;

3.5.3 specifying paints:

- (1) proper selection of paint mixing materials for different work;
- (2) proper selection of paint for surfaces;

3.5.4 operations:

- (1) painting, dyeing, and spraying on different types of surfaces;
- (2) painting patterns at the correct size; and
- (3) measuring with different tools;

3.5.5 calculation:

- (1) calculation of surfaces to be painted;
- (2) calculation of paint volume to be used; and
- (3) calculation of height and width of the working platforms, for safety.

3.6 Attitude includes development of knowledge, job analysis, decisiveness, troubleshooting, and giving advice to subordinates.

National Skills Standards Level 3

3.7 Knowledge includes:

3.7.1 safety:

- (1) safety operation; and
- (2) safety culture in the workplace;

3.7.2 materials, tools, and equipment:

- (1) preparation of spraying equipment, and proper selection of spray gun sizes;
- (2) air pump working systems;
- (3) different spraying systems;
- (4) air tube sizes and joints, and joints from the air pump;
- (5) inspection of spraying tools and equipment;
- (6) adjustment of pressure for different work;
- (7) different types of varnishes;
- (8) use of different types of varnishes;
- (9) reactions resulting from incorrect spraying and varnishing; and
- (10) possible problems on sprayed surfaces;

3.7.3 colour theory:

- (1) types of colours;
- (2) primary, secondary, and tertiary colours;
- (3) principles of colour mixing;
- (4) groups of colours;
- (5) identification of colour darkness; and
- (6) psychology of colours;

3.7.4 estimation:

- (1) data and information for estimation of paint work;
- (2) estimation of wages;
- (3) estimation of materials;
- (4) estimation of operational and petty expenses; and
- (5) calculation of profits and taxes;

3.7.5 planning and quality controlling:

- (1) planning and paint work, and evaluation of painting quality on different surfaces; and
- (2) planning on costs and expenses for the whole process.

3.8 Skills include:

3.8.1 safety for the whole painting process;

3.8.2 techniques for painting and varnishing:

- (1) use of varnishes for different surfaces;
- (2) painting, dyeing, and spraying on different surfaces;
- (3) selection of proper paints for different climates;
- (4) techniques of marble patterns and varnishing;
- (5) techniques of wood patterns and varnishing;
- (6) techniques of paint smoothing and varnishing;
- (7) techniques of gold painting and varnishing;
- (8) techniques of mixing paints according to sample paint;
- (9) inspection and correction;
- (10) trouble-shooting and quality control for painting and spraying; and
- (11) inspection of cleanliness before handing on the job.

3.9 Attitudes includes plan analysis and trouble-shooting in light of efficiency, quality, and effects.

Announced on 12 March 2009.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: plumber

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has issued the National Skills Standards for plumbers, granted by the Permanent Secretary of the Ministry of Labour as follows:

1. In this announcement, “plumber” means an individual with knowledge and skills to assemble, install, fix, maintain, and examine different building pipe systems – for example, pipelines, drainage, ventilation, and sanitary ware systems, as well as other equipment such as water dispensers, water coolers, water heaters, water filters, and water pumps. This also includes selecting and preparing equipment and tools, plan reading and drawing, quoting prices, and planning and controlling the above-mentioned work.

2. The National Skills Standards for a plumber are divided into three levels:

2.1 Level 1 means a worker with basic knowledge and skills, an average level of decision-making skills, and who needs a supervisor for instructions, making decisions, and assessing when necessary.

2.2 Level 2 means a worker with higher knowledge and skills, good capability in handling tools and equipment, possesses higher decision-making skills than Level 1, occasionally needs assistance, but has higher work quality than Level 1.

2.3 Level 3 means a worker with advanced knowledge and skills, who is able to diagnose, make decisions, advise and assist colleagues, and able to adapt knowledge and skills with technology.

3. Factors used to assess the knowledge, skills, and attitudes of plumbers are as follows:

National Skills Standards for Level 1

3.1 Knowledge consists of understanding of the following:

3.1.1 Safety in the workplace:

- (1) principles and measures for safe use of tools;
- (2) principles in preventing accidents in the workplace;
- (3) principles in safety with electricity;
- (4) fire extinguisher usage and maintenance;
- (5) principles in preventing danger from toxic substances; and
- (6) first aid;

3.1.2 classifications of types and sizes of fixtures:

- (1) pipes joints, and fixtures;
 - a) zinc-coated metal pipe;
 - b) cast-iron pipe;
 - c) ductile iron pipe;
 - d) asbestos cement pipe; and
 - e) copper pipe;
- (2) sanitary ware and other equipment;
 - a) toilets;
 - b) urinals;
 - c) wash basins;
 - d) bath tubs; and
 - e) other types of tubs;
- (3) tools and equipment;
 - a) water dispensers;
 - b) water coolers;
 - c) water heaters;
 - d) water filters; and
 - e) water pumps;
- (4) sluice valves and faucets;
- (5) drainage;
 - a) odour control equipment;
 - b) floor cleanouts;
 - c) ventilation pipes; and
 - d) drainage pipes;
- (6) equipment usage and maintenance;
- (7) types and usage of basic and machine tools; and
- (8) maintenance;

3.1.3 pipeline and sanitary ware installation techniques:

- (1) cutting and fitting different types of pipe;
- (2) assembling sanitary ware and other equipment;
- (3) installing pipes and sanitary ware with wooden, metal, and concrete structures; and
- (4) drilling, fitting, and underground pipeline system;

3.2 Skills consist of capability in the following parameters:

3.2.1 safety:

- (1) personal safety equipment usage for pipeline and sanitary ware assembly;
- (2) following pipeline and sanitary ware assembly safety measures; and
- (3) first aid procedures for incidents related to work;

3.2.2 basic and machine tool usage for pipeline and sanitary ware work;

3.2.3 basic and upon-order measurement, position specification, materials, and tools preparation;

3.2.4 pipeline and other equipment installation:

- (1) zinc-coated metal pipes;
- (2) plastic pipes;
- (3) cast-iron pipes; and
- (4) asbestos cement pipes;

3.2.5 sanitary ware and other equipment installation:

- (1) toilets;
- (2) urinals;
- (3) wash basins; and
- (4) other types of tubs;

3.2.6 sluice valve and faucet installation;

3.2.7 drainage and ventilation system installation:

- (1) odour control equipment;
- (2) floor cleanout; and
- (3) ventilation pipes;

3.2.8 drilling, fitting, and underground pipeline system; and

3.2.9 basic maintenance and fixing work for pipelines, equipment, and sanitary Ware.

3.3 Attitude includes punctuality, discipline, honesty, and cost-concern.

National Skills Standards for Level 2

3.4 Knowledge consists of understanding of the following:

3.4.1 reading plans:

- (1) definition of terminology for pipeline and sanitary ware work;
- (2) standard symbols in pipeline and sanitary ware work;
- (3) principles in materials and work; and
- (4) definition of plan format, ratio, and dimension;

3.4.2 as-build drawings;

3.4.3 distinguishing and listing materials from the plan;

3.4.4 adapting mathematics:

- (1) convert British, Metric, and Universal systems;
- (2) calculate lengths, areas, and volumes;
- (3) calculate slopes of pipes;
- (4) calculate different dimensions – for example, edge to edge, edge to diameter, edge to flange, and flange to flange, etc.

3.4.5 underground and passing-through building structure pipeline installation;

3.4.6 pipeline fitting in buildings; and

3.4.7 drainage and ventilation systems.

3.5 Skills consist of capability in the following parameters:

3.5.1 pipeline fitting and water pump installation for building water supply Systems;

3.5.2 drainage and ventilation system installation;

3.5.3 underground and passing-through building structure pipeline installation;

3.5.4 bath and hot water draining system installation;

3.5.5 copper pipe fitting;

3.5.6 drainage and ventilation system maintenance;

3.5.7 testing pipelines and sanitary ware systems:

- (1) pressure testing for building water supply system using water or wind; and
- (2) testing building drainage systems; and

3.5.8 fixing damaged surfaces caused by pipeline fitting, and sanitary ware and equipment installation.

3.6 Attitude includes concepts on knowledge development, analysis, decision-making, problem-solving, and giving advice to subordinates.

National Skills Standards for Level 3

3.7 Knowledge consists of knowledge and understanding of the following:

3.7.1 techniques in maintenance, finishing, fixing, and replacing spare parts, materials, and equipment for pipe fitting, sanitary ware installation, as well as water pumps;

3.7.2 principles of planning pipe fitting and sanitary ware installation in Construction;

3.7.3 estimating costs:

- (1) calculate the quantity and cost of materials;
- (2) calculate wages and working time;
- (3) calculate project expenses;
- (4) calculate profit and tax; and
- (5) create quotations;

3.7.4 principles in creating materials lists;

3.7.5 principles in working with other craftsmen – for example, plasterers, tile layers, carpenters, and painters;

3.7.6 fire extinguishers and equipment system and installation; and

3.7.7 cold water pipelines, drainage, and ventilation systems and installation.

3.8 Skills consist of capability in the following parameters:

3.8.1 maintenance, finishing, fixing, and replacing spare parts, materials, equipment for pipeline fitting, sanitary ware installation, as well as water pumps;

3.8.2 check damaged parts and specify replacements;

3.8.3 plan for pipeline fitting and sanitary ware installation in constructions;

3.8.4 shop drawings;

3.8.5 assign work, and control and check finished work by plumbers;

3.8.6 estimate overall costs;

3.8.7 create materials lists;

3.8.8 fire extinguisher pipe and equipment installation; and

3.8.9 cold water pipelines and drainage systems for air-conditioning system installation.

3.9 Attitude includes concepts on planning analysis and problem-solving regarding efficiency and effectiveness.

Announcement of the Skills Development Promotion Committee

National Skills Standards: electrician

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has issued the National Skills Standards for electricians, granted by the Permanent Secretary of the Ministry of Labour as follows:

1. In this announcement, “electrician” means a worker in the field of installing electric power systems, with AC not over 1,000 volts for single-phase and three-phase electricity systems, or for DC not over 1,500 volts, as well as electrical equipment in buildings, including problem-solving and checking the power system. This includes maintenance, using tools, using electrical equipment in buildings, and basic principles regarding household electrical appliances, in skills stated in each level.

2. The National Skills Standards for electricians are divided into three levels:

2.1 Level 1 means a worker in the field of installing electric power systems and electrical equipment in buildings.

2.2 Level 2 means a worker in the field of installing electric power systems and electrical equipment in buildings, and problem-solving.

2.3 Level 3 means a worker in the field of installing electric power systems and electrical equipment in buildings, and checking the power system.

3. Factors used to assess the knowledge, skills, and attitudes of electricians are as follows:

National Skills Standards for Level 1

3.1 Knowledge consists of knowledge and understanding of the following:

3.1.1 Safety in working with electricity:

- (1) basic usage of tools and equipment for self-protection;
- (2) avoidance of danger from electricity;
- (3) first aid for electric shock or accident; and
- (4) safety symbols;

3.1.2 characteristics of cables, bus bars, resistors, and inductors;

3.1.3 selection of types and sizes of cables, bus bars, resistors, and inductors;

3.1.4 equipment for assembly, installation, wiring, and power system;

3.1.5 install receptacles, switches, and protective conductors;

3.1.6 basic principle of household electric appliances;

3.1.7 tools for measuring voltage, current, and resistance; and

3.1.8 basic knowledge on electricity and installation standards.

3.2 Skills consist of capability in the following parameters:

- 3.2.1 basic usage and maintenance of tools and equipment for self-protection;
- 3.2.2 selection of equipment to prevent overcurrent – for example, circuit breakers and fuses;
- 3.2.3 check electrical equipment and parts before installing with electricity;
- 3.2.4 wall wiring with electrical wire clips;
- 3.2.5 wiring with PVC pipes;
- 3.2.6 installing electrical equipment;
- 3.2.7 assemble different types of conductors:
 - (1) assemble all types of wires;
 - (2) assemble conductors with power connectors; and
 - (3) using insulating tape in wire connecting areas;
- 3.2.8 assemble receptacles;
- 3.2.9 assemble main distribution board power circuits;
- 3.2.10 assemble power circuits to control lighting systems; and
- 3.2.11 check power circuit operation.

3.3 Attitude includes punctuality, discipline, honesty, and cost-concern.

National Skills Standards for Level 2

3.4 Knowledge consists of knowledge and understanding of the following:

- 3.4.1 safety in working with electricity:
 - (1) basic usage of tools and equipment for self-protection;
 - (2) avoidance of danger from electricity;
 - (3) first aid for electric shock; and
 - (4) safety symbols;
- 3.4.2 regulations for electricity installation by electricity authorities;
- 3.4.3 reading basic electricity symbols and diagrams (plans);
- 3.4.4 220-volt, single phase, two-wire power system, and 220/380-volt, three-phase, four wires;

- 3.4.5 select types and sizes of cables and bus bars to match each wiring technique – for example, open wiring, using electrical conduits, above ground, wireways, and underground wiring, etc.;
- 3.4.6 operation of overcurrent prevention equipment – for example, circuit breakers and fuses;
- 3.4.7 solving power supply system problems; and
- 3.4.8 basic household appliance maintenance.

3.5 Skills consist of capability in the following parameters:

- 3.5.1 tools for measuring voltage, current frequency, resistance, power factor, and watt hour meter;
- 3.5.2 assemble AC watt meter;
- 3.5.3 using an ohm meter to detect errors in the power circuit;
- 3.5.4 installing main switch and sub-circuit control switch;
- 3.5.5 assembling switches for electric equipment in building;
- 3.5.6 wiring with electrical conduit;
- 3.5.7 different types of wiring electrical conduit:
 - (1) rigid metal conduit (RMC);
 - (2) intermediate metal conduit (IMC);
 - (3) electrical metallic tubing (EMT);
 - (4) flexible metal conduit (FMC); and
 - (5) non-metallic tubes – for example, PVC, PE, etc.;
- 3.5.8 installing power circuits; and
- 3.5.9 first aid for electric shock

3.6 Attitude includes concepts on knowledge development, analysis, decision-making, problem-solving, and giving advice to subordinates.

National Skills Standards for Level 3

3.7 Knowledge consists of knowledge and understanding of the following:

- 3.7.1 safety in working with electricity;
- 3.7.2 power system in Thailand;
- 3.7.3 emergency power supply and transfer switch;

- 3.7.4 electric motors and control equipment;
- 3.7.5 power transformers:
 - (1) operation of power transformers;
 - (2) power transformer, single phase and three phase;
 - (3) selecting the size of the power transformer;
 - (4) installing power transformers; and
 - (5) checking and maintenance;
- 3.7.6 circuit breaker;
- 3.7.7 underground wiring and surge arrester;
- 3.7.8 power factor correction;
- 3.7.9 equipment for measuring tools – for example, current transformer (CT), VT, etc.;
- 3.7.10 basic fire alarm system;
- 3.7.11 types of light bulbs;
- 3.7.12 selecting types and sizes of electrical conduits and wireways;
- 3.7.13 different kinds of wiring;
- 3.7.14 installing electrical equipment in buildings;
- 3.7.15 reading intermediate electric symbols and diagrams (plans);
- 3.7.16 creating bills of quantity (BOQ);
- 3.7.17 checking the power system:
 - (1) following diagrams (plans);
 - (2) size of wires and conductors;
 - (3) complying with the equipment regulations;
 - (4) stability of equipment;
 - (5) power system continuity –
 - a) resistance of insulation; and
 - b) continuity and resistance of the ground connection system;
 - (6) operation of equipment; and

(7) summary.

3.8 Skills consist of capability in the following parameters:

3.8.1 assembling controller circuits for buildings;

3.8.2 wiring with electric conduits, wireways, metal trays, non-metallic trays, and installing bus bars;

3.8.3 usage and maintenance of electricity tools, equipment, and measuring tools;

3.8.4 installing motor controllers in motor controller boards:

(1) organizing equipment in motor controller boards;

(2) adjusting protective relay;

(3) wiring in motor controller boards; and

(4) checking and problem-solving errors in motor controllers;

3.8.5 motor controllers:

(1) direct on-line starter;

(2) reversing starters;

(3) star-delta; and

(4) motor protection systems;

3.8.6 checking the power system; and

3.8.7 creating material lists with prices, according to plans.

3.9. Attitude includes concepts on planning analysis and problem-solving regarding efficiency and effectiveness

Announced on 2 October 2009.

Somchai Chumrat.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Tourism occupations

National Skills Standards: hotel business

(Room attendant)

According to section 10 (2) of the Vocational Training Promotion Committee Act 1994, and the Announcement of the Vocational Training Board, clauses 1, 2, 3, 4, and 5, about the setting of standard specifications for skilled workers, the Board hereby prescribes the National Skills Standards for the hotel business, as follows:

1. “Room attendant” refers to the staff responsible for cleaning guest rooms and tasks to facilitate and assist hotel guests, according to the prescribed standards.

2. The National Skills Standards in this branch are divided into two levels as follows:

2.1 Level 1 – Basic Level.

2.2 Level 2 – Intermediate Level.

3. Candidates who wish to take the National Skills Standards Test for the Hotel Business Career Branch, for the position of room attendant, are required to participate in an interview and/or writing test and practical performance test, to prove their qualifications, knowledge, and skills required, and to achieve the prescribed standards.

4. All the tests stated above shall require the following qualifications:

4.1 Good knowledge on time saving.

4.2 Standard working procedures.

4.3 Accurate selection and economic usage of supplies and materials.

4.4 Proper selection and maintenance of equipment and machines.

4.5 Safe working procedures.

4.6 Successful performance results.

5. Successful candidates shall receive a National Skills Standards Certificate, stating the name, surname, date, and level of achievement.

National Skills Standards Test, in the hotel business, for the position of room attendant Level 1

5.1 Candidates must have the following qualifications:

5.1.1 not less than lower secondary education (Matthayom 3) or equivalent;

5.1.2 able to communicate in English;

5.1.3 good personality; and

5.1.4 experience in the relevant career branch to be tested.

5.2 The required knowledge and understanding consists of:

- 5.2.1 basic knowledge on housekeeping;
- 5.2.2 basic English communication skills;
- 5.2.3 safe working procedures;
- 5.2.4 use of basic chemical substances;
- 5.2.5 using cleaning materials, and cleaning procedures;
- 5.2.6 using, maintaining, and storing cleaning equipment such as vacuum cleaners and brushes;
- 5.2.7 cleaning of bedrooms ;
- 5.2.8 cleaning of bathrooms;
- 5.2.9 preparing sufficient linen and material for work;
- 5.2.10 making up beds;
- 5.2.11 basic fire prevention; and
- 5.2.12 giving good quality services.

5.3. The required abilities are:

- 5.3.1 usage of basic chemical substances;
- 5.3.2 usage, maintenance, and storage of cleaning equipment;
- 5.3.3 cleaning bedrooms;
- 5.3.4 cleaning bathrooms;
- 5.3.5 preparation of sufficient linen and material for work;
- 5.3.6 making up beds; and
- 5.3.7 basic fire prevention.

National Skills Standards Test, the hotel business for the position of room attendant Level 2:

5.4 Qualifications: Candidates must have at least one year's job experience after receiving the National Skills Standards Certificate, the hotel business, for the position of room attendant Level 1.

In the case of candidates who have passed the National Skills Standards Test Level 1 with very good marks, and deemed by the Test Control Subcommittee as highly qualified candidates, they may obtain permission to apply for the National Skills Standards Test Level 2 without waiting for the one year of work experience.

The required knowledge and understanding consists of:

- 5.4.1 basic first aid knowledge;
- 5.4.2 safety and security systems and fire prevention;
- 5.4.3 proficiency in reading, writing, and communicating in English;
- 5.4.4 economical and efficient use of cleaning equipment and supplies;
- 5.4.5 using chemical cleaning substances on sanitary fixtures, furniture, and other items;
- 5.4.6 preparing necessary backup supplies for room service;
- 5.4.7 disbursement procedures, appropriate usage, and ordering and replenishing stocks of linen;
- 5.4.8 inspecting and reporting lost items of guests;
- 5.4.9 classification and reporting of damaged appliances and equipment found in guest rooms;
- 5.4.10 basic methods in dealing with guest's complaints;
- 5.4.11 inspecting and checking orderliness in guest rooms; and
- 5.4.12 efficient control of service.

The required abilities are:

- 5.4.13 efficient usage of cleaning equipment;
- 5.4.14 usage of chemical cleaning substances on sanitary fixtures and furniture;
- 5.4.15 usage of chemical substances for stain removal;
- 5.4.16 inspecting and reporting items forgotten by guests in guest rooms;
- 5.4.17 writing reports on repairs and maintenance of electrical appliances;
- 5.4.18 preparing necessary back-up supplies for room service; and
- 5.4.19 inspecting and checking the orderliness in guest rooms.

Announcement of the Skills Development Promotion Committee

National Skills Standards: baker

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has issued the National Skills Standards for Baker, granted by the Permanent Secretary of the Ministry of Labour as follows:

1. In this announcement, “baker” means an individual with knowledge, skills, and attitude regarding the preservation of bread, equipment, and ingredients, and who abides by the usage procedures, correctly and safely.

2. The National Skills Standards for baker are divided into two levels:

2.1 Level 1 means an individual with knowledge and basic skills in baking different kinds of bread, and following supervisor’s suggestions and directions.

2.2 Level 2 means an individual with knowledge and skills in baking different kinds of bread, and understanding of procedures, monitoring process, planning process, and be able to implement all processes well.

3. Factors used to assess the knowledge, skills, and attitudes of bakers are as follows:

National Skills Standards for Level 1

3.1 Knowledge consists of knowledge and understanding of the following:

3.1.1 basic knowledge of bread:

- (1) benefits; and
- (2) nutrition facts;

3.1.2 equipment for baking bread:

- (1) manual equipment;
- (2) labour-saving equipment;
- (3) equipment selection; and
- (4) cleaning and maintenance;

3.1.3 ingredients for baking bread:

- (1) main ingredients;
- (2) additional ingredients;
- (3) ingredients selection; and
- (4) preservation;

3.1.4 techniques and procedures in baking bread:

- (1) mixing and kneading;
- (2) fermentation;
- (3) formation; and
- (4) baking;

3.1.5 types of bread:

- (1) baking process;
- (2) hard bread;
- (3) loaf bread;
- (4) soft roll; and
- (5) sweet dough;

3.1.6 bread preservation;

3.1.7 sanitation and safety in baking bread;

3.1.8 sanitation, safety, and environment of the workplace:

- (1) workplace safety measures;
- (2) self-protection equipment;
- (3) safety in using equipment; and
- (4) basic first aid knowledge.

3.2 Skills consist of capability in the following parameters:

3.2.1 ingredients selection:

- (1) flour;
- (2) yeast;
- (3) liquids;
- (4) sugar; and
- (5) fat;

3.2.2 ingredients weighting and measuring;

3.2.3 equipment selection:

- (1) mixing and kneading machines;
- (2) prover/proofing cabinets;

(3) ovens; and

(4) other equipment;

3.2.4 baking different kinds of bread:

(1) hard bread;

(2) loaf bread;

(3) soft roll; and

(4) sweet dough;

3.2.5 techniques and procedures in baking bread:

(1) mixing;

(2) fermentation;

(3) preparation of dough and formation; and

(4) baking bread;

3.2.6 cleaning and maintenance:

(1) equipment; and

(2) workplace;

3.2.7 safety in the workplace; and

3.2.8 sanitation and safety in baking bread.

3.3 Attitude includes work, punctuality, disciplinary, honesty and cost-concern.

National Skills Standards for Level 2

3.4 Knowledge consists of knowledge and understanding of the following:

3.4.1 advance knowledge of bread:

(1) benefits;

(2) nutrition facts; and

(3) different forms of bread:

a) frozen;

b) processed;

c) for special holidays; and

d) for special occasions;

3.4.2 equipment for baking bread:

- (1) manual equipment;
- (2) labour-saving equipment;
- (3) equipment selection;
- (4) cleaning and maintenance;
- (5) new equipment; and
- (6) industrial equipment;

3.4.3 ingredients for baking bread:

- (1) main ingredients;
- (2) additional ingredients;
- (3) ingredients selection;
- (4) preservation;
- (5) quality standards specification;
- (6) acquiring and sorting ingredients; and
- (7) assessing ingredients quality;

3.4.4 techniques and procedures in baking bread:

- (1) mixing and kneading;
- (2) fermentation;
- (3) formation;
- (4) baking;
- (5) techniques and procedures in baking different types of bread; and
- (6) analysis and problem solving;

3.4.5 types of bread:

- (1) hard bread;
- (2) loaf bread;
- (3) soft roll;
- (4) sweet dough; and

(5) special types of bread;

3.4.6 bread preservation;

3.4.7 sanitation and safety in baking bread;

3.4.8 sanitation, safety, and environment of the workplace:

(1) workplace safety measures;

(2) self-protection equipment;

(3) safety in using equipment; and

(4) basic first aid knowledge;

3.4.9 management:

(1) planning and budgeting;

(2) control of the working process;

(3) monitoring, analysis, and evaluation; and

(4) coaching;

3.5 Skills consist of capability in the following parameters:

3.5.1 ingredients selection:

(1) flour;

(2) yeast;

(3) liquids;

(4) sugar;

(5) fat; and

(6) additional nutrients;

3.5.2 ingredients weighting and measuring;

3.5.3 equipment selection:

(1) mixing and kneading machines;

(2) prover/proofing cabinets;

(3) ovens; and

(4) other equipment;

3.5.4 baking different kinds of bread:

- (1) hard bread;
- (2) loaf bread;
- (3) soft roll;
- (4) sweet dough; and
- (5) special types of bread;

3.5.5 techniques and procedures in baking bread:

- (1) mixing;
- (2) fermentation;
- (3) preparation of dough and formation; and
- (4) baking bread;

3.5.6 cleaning and maintenance:

- (1) equipment;
and
- (2) workplace;

3.5.7 safety in the workplace; and

3.5.8 sanitation and safety in baking bread.

3.6 Attitude includes concepts on knowledge development, analysis, decision-making, problem-solving, and giving advice to subordinates.

Announced 10 February 2010.

Somchai Chumrat.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: Thai cook

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Committee for Skills Development has specified the National Skills Standards for Thai cooks, granted by the Ministry of Labour, as follows:

1. “Thai cook” means a person who is responsible for preparing and cooking Thai food: savouries, desserts, and snacks, using proper methods and food hygiene practice, including decorating and carving in Thai style.

2. The National Skills Standards, Thai cook is divided into two levels: Level 1 (Thai cook 1), and Level 2 (Thai cook 2), as follows:

2.1 Level 1 (Thai cook 1) means a person who has skills in, knowledge of, and understanding of Thai Cooking.

2.2 Level 2 (Thai cook 2) means a person who has professional knowledge, understanding, skill, and experience in Thai cooking with Thai menus, and is certified by the standard of the Ministry of Public Health’s “Clean Food Good Taste”, or equivalent.

3. The technical requirements are as follows:

National Skills Standards – Thai cook Level 1

3.1 Must have knowledge and understanding of:

3.1.1 proper use and handling of raw materials:

- (1) vegetables and fruits;
- (2) meats;
- (3) perishable and non-perishable food;
- (4) herbs and spices;
- (5) seasons for vegetables and fruits; and
- (6) identification of the freshness of perishable foods;

3.1.2 preliminary preparation of raw materials:

- (1) principles of nutrition;
- (2) principles of sanitation;
- (3) cleaning; and
- (4) holding and storage;

3.1.3 reading, understanding, and writing recipes:

- (1) meaning of abbreviations;

- (2) use of measuring equipment;
- (3) cooking equipment and tools; and
- (4) writing recipe techniques;

3.1.4 specification of processed foods:

- (1) appearance;
- (2) colour;
- (3) texture;
- (4) flavour;
- (5) taste; and
- (6) temperature;

3.1.5 equipment and tools:

- (1) cleaning; and
- (2) holding and storage;

3.1.6 operating of cooking equipment:

- (1) ovens;
- (2) microwave ovens;
- (3) selection and use of heating equipment;
- (4) cooling equipment; and
- (5) food slicers and food grinders;

3.1.7 safety precaution and first aid:

- (1) principles of work place safety;
- (2) use of personal safety devices;
- (3) safety in using equipment and tools; and
- (4) first aid; and

3.1.8 Basic English knowledge in food and beverages.

3.2 Skills: candidates must have skills for:

3.2.1 preliminary preparation of raw materials:

- (1) waste control;

- (2) cleaning;
- (3) cutting; and
- (4) holding and storage;

3.2.2 understanding of recipes:

- (1) preparation of ingredients;
- (2) measurement of ingredients; and
- (3) preparing equipment;

3.2.3 basic fruit and vegetable carving;

3.2.4 plate presentation (plating); holding before serving;

3.2.5 food safety:

- (1) personal hygiene and public hygiene;
- (2) food hygiene practice; and
- (3) sanitation of the workplace and equipment;

3.2.6 cooking:

1) savoury food:

a) single-dish meals:

- *khao paad* (fried rice);
- *khao clook kapi* (rice with shrimp paste);
- *kanom jeen souw nam* (rice noodles with ground dried shrimp, pineapple, and coconut milk);
- *guay tiaw pad lad na* (stir-fried noodles with thick gravy);
- *guay tiaw pad siew* (Thai stir-fried rice noodles with dark soy sauce); and
- *guay tiaw pad Thai* (Thai stir-fried rice noodles with shrimps);

b) Thai salads and dressings:

- *yum woon sen* (mung bean vermicelli spicy salad);
- *yum hua plee* (banana flower bud spicy salad);

- *yum tua plu* (winged bean spicy salad); and
 - *yum som-o* (pomelo spicy salad);
- c) chili dips and vegetable condiments:
- *nam prig kapi* (shrimp paste chilli dip);
 - *nam prig noom* (grilled green chilli dip);
 - *nam prig ong* (pork and tomato chilli sauce); and
 - *laon tao jiaw* (fermented soy bean with coconut milk sauce);
- d) soups, chili paste, and curry paste:
- *gaeng jued* (clear soups);
 - *tom yum* (hot and sour soup);
 - *tom ka* (coconut milk soup);
 - *gaeng liang* (spicy vegetable soup);
 - *gaeng som* (chilli paste soup);
 - *gaeng khiew waan* (green curry); and
 - *gaeng ped* (red curry);
- e) pan-fried with crushed chili or with chili paste:
- *phad gra prao* (pan-fried meat with basil leaves and crushed chilli); and
 - *phad prik gaeng* (pan-fried meat with chilli paste);
- f) Thai popular dishes:
- *khai jiaw* (Thai omelette);
 - *gai yang* (grilled chicken, Thai style);
 - *moo thod grathiem prig Thai* (fried pork with garlic and pepper); and
 - *pla rad prig* (fried fish with chilli sauce);

2) Thai desserts:

a) boiled in light syrup desserts:

- *mun tom nam tan* (boiled sweet potato in light syrup);
- *thua khiaw tom nam tan* (boiled mung bean in light syrup); and
- *thua dang tom nam tan* (boiled red bean in light syrup);

b) steamed desserts:

- *kanom gluay* (steamed banana with coconut); and
- *kanom fag thong* (steamed pumpkin with coconut);

c) desserts in light syrup and/or coconut milk:

- *loi kaew* (fruit in light syrup with ice);
- *tub tim grob* (water chestnut dumpling in coconut milk and crushed ice);
- *fag thong/mun/pheuk gaeng buad* (pumpkin/sweet potato/taro in coconut milk);
- *gluay buad chee* (boiled banana in coconut milk);
- *sakoo piag, khao niaw biag* (tapioca with coconut cream, sticky rice with coconut cream); and
- *bua loi* (sticky rice balls in coconut milk); and

d) other Thai desserts:

- *voon ponlamai* (fruit jelly).

3.3 Attitude includes accurate timing, discipline, honesty, and economy.

National Skills Standards – Thai cook Level 2

3.4 Candidates must have knowledge and understanding of:

3.4.1 proper usage and handling of raw materials:

- (1) vegetables and fruits;
- (2) meats;
- (3) perishable and non-perishable food;
- (4) herbs and spices; and
- (5) vegetables and fruits in season;

3.4.2 preliminary preparation of raw cooking ingredients:

- (1) principles of nutrition;
- (2) principles of sanitation;
- (3) cleaning; and
- (4) holding and storage;

3.4.3 reading, understanding, and writing recipes

- (1) meanings of abbreviations;
- (2) use of measuring equipment and their equivalence;
- (3) cooking equipment and tools;
- (4) writing recipe techniques; and
- (5) food costing;

3.4.4 characteristics of processed foods:

- (1) appearance;
- (2) colour;
- (3) texture;
- (4) flavour;
- (5) taste;
- (6) temperature; and
- (7) garnishing and decoration;

3.4.5 purchasing:

- (1) specifications of raw materials; and
- (2) purchasing requisitions;

3.4.6 equipment and tools:

- (1) cleaning; and
- (2) holding and storage;

3.4.7 operating of cooking equipment:

- (1) ovens;
- (2) microwave ovens;
- (3) selection and use of heating equipment;
- (4) cooling equipment; and
- (5) food slicers and food grinders;

3.4.8 safety precautions and first aid:

- (1) principles of workplace safety;
- (2) use of personal safety devices;
- (3) safety in using equipment and tools; and
- (4) first aid;

3.4.9 hygienic practices and food safety:

- (1) risk food and controls;
- (2) personal hygiene of cooks and cooks' helpers;
- (3) cleaning and sterilization; and
- (4) hygienic practices in cooking;

3.4.10 kitchen management:

- (1) quality control of food preparation;
- (2) work order preparation; and
- (3) waste management;

3.4.11 English knowledge in food and beverages – intermediate level; and

3.4.12 knowledge of applied Thai food for specific needs:

- (1) vegetarian food; and
- (2) halal food.

3.5 Skills: Candidates must have skills in:

3.5.1 preliminary preparation of raw materials:

- (1) waste control;
- (2) cleaning;

(3) cutting; and

(4) holding and storage;

3.5.2 understanding of recipes:

(1) preparation of ingredients;

(2) measurement of ingredients; and

(3) preparing equipment;

3.5.3 basic fruit and vegetable carving;

3.5.4 plate presentation (dishing);

(1) choosing food containers; and

(2) dividing food and serving portion;

3.5.5 food safety:

(1) personal hygiene and public hygiene;

(2) food hygiene and food sanitation practices;

(3) sanitation of the workplace and equipment; and

(4) workplace and equipment;

3.5.6 cooking:

(1) savoury food:

a) single-dish meals:

- *guay tiaw paad thai* (fried rice noodles, Thai style);
- *guay tiaw pad sen chan* (Thai stir-fried noodles with crab);
- *khao paad* (fried rice);
- *khao clook kapi* (rice with shrimp paste);
- *khao clook nam prig long rua* (rice with chilli paste and condiments);
- *mee gathi* (rice vermicelli with coconut milk);
- *kanom jeen souw nam* (rice noodles with ground dried shrimp, pineapple, and coconut milk);

- *kanom jeen nam ya* (rice noodles with ground fish curry and vegetable condiments);
- *kanom jeen nam pig* (rice noodles with ground shrimp curry and condiments);
- *kanom jeen num giaw* (rice noodles with ground pork and ground beef curry, northern style); and
- *guay tiaw* (noodles);

b) Thai salads and dressings:

- *som tum* (papaya spicy salad);
- *yum ta kai* (vegetables with spicy salad, Thai style);
- *yum yai* (mixed meat spicy salad, Thai style);
- *yum woon sen* (mung bean vermicelli spicy salad);
- *yum hua plee* (banana flower bud spicy salad);
- *yum tua plu* (winged bean spicy salad); and
- *yum som-o* (pomelo spicy salad);

c) chili dips and vegetable condiments:

- *nam prig kapi* (shrimp paste chilli dip);
- *nam prig long rua* (fried shrimp paste chilli dip with condiments and vegetables);
- *nam prig goong sod* (fresh shrimp chili dip);
- *nam prig noom* (grilled green chili dip);
- *nam prig ong* (pork and tomato chili sauce);
- *laon tao jiaw* (fermented soy bean with coconut milk sauce);
- *laon pla ra* (fermented fish with chili sauce);
- *laon goong sod* (fermented shrimp with coconut milk dip);
- *laon pla jao* (fermented fish with coconut milk sauce); and
- *kapi khua*;

d) soup, chili paste, and curry paste:

- *gaeng jued* (clear soup);

- *tom yam* (hot and sour soup);
- *tom ka* (coconut milk soup);
- *gaeng liang* (spicy vegetable soup);
- *gaeng som* (chili paste soup);
- *tom som* (spicy sweet and sour dried fish soup);
- *tom khlung* (spicy and sour dried fish soup);
- *gaeng khiaw waan* (green curry);
- *gaeng pad* (red curry);
- *gaeng khua* (mild red curry);
- *gaeng masaman* (masaman curry);
- *phanaeng* (peanut curry); and
- *haw mog* (steamed meat curry with coconut cream);

e) pan-fried with crushed chili or chili paste:

- *phad prig khing* (pan-fried meat and string bean with curry paste);
- *phad gra prao* (pan-fried meat with basil leaves with crushed chili); and
- *phad prik gaeng* (pan-fried meat with chili paste);

f) Thai popular dishes:

- *khai jiaw* (Thai omelette);
- *khai yud sai* (stuffed omelette, Thai style);
- *gai yang* (grilled chicken, Thai style);
- *moo thod grathiem prig Thai* (fried pork with garlic and pepper);
- *pla thod grathiem prig Thai* (fried fish with garlic and pepper);
- *pla rad prig* (fried fish with chili sauce);
- *khao ob sapparod* (fried rice in pineapple shell);
- *goong ob woon sen* (baked prawn with mung bean vermicelli in a clay pot); and

- *pla sam rod* (fried fish with spicy chili sauce);

g) Thai snacks:

- *thod mun* (fried fish patty);
- *mee krob* (deep fried rice vermicelli with tamarind and sugar);
- *satay* (baked stringed meat);
- *khoa tang na tang* (rice crust with spicy sauce);
- *por pia thod* (spring roll);
- *kra toong tong* (fried flour with meat and vegetable);
- *toong tong* (fried flour with meat);
- *sa ku sai muu* (steamed sago flour ball with pork);
- *khoa krieb paak mor* (steamed flour with pork);
- *ka nom krok* (coconut milk pancake);
- *pun krib* (fried flour with meat); and
- *mieng kum* (mixed Thai herbs wrapped in leaves);

(2) Thai desserts:

a) boiled in light syrup desserts:

- *mun tom nam tan* (boiled sweet potato in light syrup);
- *thua khiaw tom nam tan* (boiled mung bean in light syrup); and
- *thua dang tom nam tan* (boiled red bean in light syrup);

b) boiled in heavy syrup desserts:

- *mun fag thong pheuk chaem* (potato/pumpkin/taro in heavy syrup);
- *gluay chaem* (banana in heavy syrup);
- *sake chaem* (breadfruit in heavy syrup); and
- *look tan chaem* (palmfruit in heavy syrup);

c) steamed desserts:

- *kanom gluay* (steamed banana with coconut);
- *kanom fag thong* (steamed pumpkin with coconut);

- *kanom mun* (steamed tapioca with coconut);
- *kanom sod sai* (steamed rice flour stuffed with sweet coconut flake);
- *kanom tuay* (steamed rice pudding with coconut cream);
- *kanom nam dok mai* (steamed rice pudding); and
- *salle* (steamed sponge cake);
- *sang ka ya* (egg with custard);
- *pui fai* (steamed sponge cake in paper cups);
- *khao niaw moon* (steamed sticky rice with coconut milk);
- *khao tom mud* (steamed sticky rice in banana leaves); and
- *khao tom tud* (sticky rice cake);

d) desserts in light syrup and/or coconut milk:

- *loi kaew* (fruit in light syrup with ice);
- *sarim* (vermicelli in coconut syrup with ice);
- *lod chong* (rice flour noodle in coconut syrup with ice);
- *tub tim grob* (water chestnut dumpling in coconut milk with crushed ice);
- *fag thong/mun/pheuk gaeng buad* (pumpkin/sweet potato/taro in coconut milk);
- *gluay buad chee* (boiled banana in coconut milk);
- *sakoo piag, khao niaw piag* (tapioca with coconut cream, sticky rice with coconut cream); and
- *bua loi* (sticky rice balls in coconut milk);

e) desserts made from rice flour and sticky rice flour:

- *kanom tom dang tom khao* (steamed red and white sticky rice flour dumpling in coconut flake);
- *kanom leb mue nang* (steamed rice flour with grated coconut, sugar, and tossed sesame);

- *kanom naew* (steamed rice flour with grated coconut, palm sugar, and crispy rice); and
 - *tao pab sai kem sai wan* (steamed mung bean dumpling and prawn dumpling with grated coconut);
- f) egg desserts in syrup:
- *med kanoon* (dipped mung bean balls in egg yolk in heavy syrup); and
 - *foi thong* (sweet egg yolk thread);
- g) baked desserts:
- *mo gaeng* (baked Thai custard); and
 - *som ma nus* (Thai meringue);
- h) fried desserts:
- *gluay thod* (banana fritter);
 - *fak bua* (fried rice flour cake);
 - *khao mow* (fried banana coated with sweetened coconut);
 - *mun rung nok* (julienne sweet potato);
 - *khai nok kratha* (fried sweet potato balls);
 - *khai hong* (fried stuffed dough balls);
 - *ka nom kong* (fried mung bean paste); and
 - *thong plu* (fried dough balls);
- i) other Thai desserts:
- *thong eak* (mushed egg yolk topped with gold leaf);
 - *voon gathi* (coconut jelly);
 - *voon ponlamai* (fruit jelly); and
 - *voon lai* (egg jelly);

3.6 Attitude includes conceptual framework for developing knowledge, work attitude, making decisions, solving problems, and giving advice to employees.

Approved by the Skills Development Promotion Committee on 22 August 1992.

Announcement of the Skills Development Promotion Committee

National Skills Standards: front desk clerk/receptionist

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Committee for Skills Development has issued the National Skills Standards for front desk clerk/receptionist, granted by the Ministry of Labour as follows:

1. In this announcement, “front desk clerk/receptionist” means an individual responsible for the check-in and check-out process, as well as providing information, news, and promoting sales in hotels and other types of accommodation.

2. The National Skills Standards for front desk clerks/receptionists are divided into two levels:

2.1 Level 1. Front desk clerk/receptionist means an individual responsible for the check-in and check-out process, as well as providing information, news, and promoting sales in hotels and other types of accommodation.

2.2 Level 2. Front desk supervisor/chief receptionist means an individual who supervises and resolves situations involving check-in and check-out, as well as providing information, news, and promoting sales in hotels and other types of accommodation.

3. Factors used to assess the knowledge, skills, and attitudes of front desk clerks/receptionists are as follows:

National Skills Standards Level 1

3.1 Knowledge consists of knowledge and understanding of the following:

3.1.1 basic management of hotels, accommodation, and the front desk department:

- (1) hotel structure;
- (2) front desk department structure;
- (3) roles and responsibilities of front desk clerks/receptionists; and
- (4) rules, regulations, and duties for front desk clerks/receptionists;

3.1.2 tools and equipment:

- (1) for check-in usage;
- (2) for check-out usage;

3.1.3 check-in and check-out process:

- (1) knowledge on hotel accommodation;
- (2) payment process;
- (3) forms and documents; and
- (4) check-in and check-out process for different types of guests;

3.1.4 service for check-in process and other services:

- (1) information on different hotel department services;
- (2) basic knowledge of the tourism industry;
- (3) transportation reservation information; and
- (4) other services;

3.1.5 communication skills for front desk clerks/receptionists:

- (1) verbal communication;
- (2) written communication;
- (3) handling guests' complaints, and recommendations;
- (4) basic English usage; and
- (5) English used in career:
 - a) welcoming;
 - b) check-in and registration;
 - c) check-out; and
 - d) other services;

3.1.6 safety:

- (1) procedures in emergency situations;
- (2) fire extinguishing and procedures during fire situations; and
- (3) basic first-aid knowledge; and

3.1.7 promoting sales:

- (1) price structure; and
- (2) sales increase techniques.

3.2 Skills consist of capabilities in the following parameters:

3.2.1 service preparation:

- (1) equipment preparation;
- (2) document preparation; and
- (3) miscellaneous preparation;

3.2.2 check-in:

- (1) check-in documents preparation;
- (2) monitoring check-in forms and payment documents;
- (3) escorting guests to rooms;
- (4) explaining information and use of equipment in rooms;
- (5) document filing; and
- (6) collaboration with other departments; and

3.2.3 check-out:

- (1) document and billing preparation;
- (2) payment process;
- (3) checking guests' satisfaction
- (4) showing gratitude and bidding farewell;
- (5) collaboration with other departments; and
- (6) document filing.

3.3 Attitude includes work, punctuality, discipline, honesty, and cost-concern:

3.3.1 qualifications and personality of front desk clerks/receptionists;

3.3.2 Thai manners for front desk work; and

3.3.3 moral standards for front desk clerks/receptionists.

National Skills Standards Level 2

3.4 Knowledge consists of knowledge and understanding of the following:

3.4.1 basic management of hotels, accommodation, and front desk departments:

- (1) hotel and accommodation structure;
- (2) front desk and related department structures;
- (3) roles and responsibilities of supervisors; and
- (4) supervision of employees according to rules and regulations;

3.4.2 tools and equipment:

- (1) knowledge and expertise on using check-in tools and equipment; and

- (2) knowledge and expertise on using check-out tools and equipment;

3.4.3 check-in and check-out processes:

- (1) knowledge of hotel accommodation management;
- (2) knowledge and expertise on payment processes;
- (3) supervision of forms and documents;
- (4) supervision of check-in and check-out processes for different types of guests;

3.4.4 service for check-in process and other services:

- (1) supervision on providing concise and up-to-date information regarding different hotel department services;
- (2) supervision on providing concise and up-to-date knowledge on the tourism industry;
- (3) supervision on providing concise and up-to-date transportation reservation information; and
- (4) other services;

3.4.5 communication skills for front desk supervisors/chief receptionists:

- (1) verbal communication;
- (2) written communication;
- (3) handling guests' complaints, and recommendations;
- (4) expertise in English usage; and
- (5) expertise in English used in career:
 - a) welcoming;
 - b) check-in;
 - c) check-out;
 - d) handling impromptu situations; and
 - e) other services;

3.4.6 control and supervision on safety:

- (1) procedures in emergency situations;
- (2) fire extinguishing and procedures during fire situations; and
- (3) basic first-aid knowledge;

3.4.7 promoting sales:

- (1) guest culture and satisfaction;
- (2) decision-making authority regarding price structures;
- (3) the art of increasing sales performance; and
- (4) creating customer satisfaction;

3.4.8 monitoring:

- (1) accommodation usage reports;
- (2) decision-making and directives; and
- (3) problem solving; and

3.4.9 coaching for front desk clerks/receptionists:

- (1) basic knowledge on job description; and
- (2) basic skills involved in job description.

3.5 Skills consist of capabilities in the following parameters:

3.5.1 supervision of service preparation:

- (1) equipment preparation;
- (2) document preparation; and
- (3) miscellaneous preparation;

3.5.2 supervision of check-in:

- (1) check-in documents preparation;
- (2) monitoring check-in forms and payment documents;
- (3) escorting guests to rooms;
- (4) explaining information and use of equipment in rooms;
- (5) document filing; and
- (6) collaboration with other departments;

3.5.3 supervision of check-out:

- (1) document and billing preparation;
- (2) payment process;

(3) collaboration with other departments; and

(4) document filing;

3.5.4 online check-in;

3.5.5 online check-out;

3.5.6 communicating in English;

3.5.7 coaching for front desk clerks/receptionists:

(1) basic knowledge on job description; and

(2) basic skills involved in job description.

3.6 Attitude includes work, punctuality, discipline, honesty, and cost-concern:

3.6.1 encouraging and developing good personality for front desk clerks/receptionists and front desk supervisors/chief receptionists;

3.6.2 Thai manners for front desk work; and

3.6.3 moral standards for front desk supervisors/chief receptionists.

Announced on 10 February 2010.

Somchai Chumrat.

Permanent Secretary for Labour.

Chairman of the Skills Development Promotion Committee.

Announcement of the Skills Development Promotion Committee

National Skills Standards: *nuad* Thai practitioner (traditional Thai massager)

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Committee for Skills Development has specified the National Skills Standards, *nuad* Thai practitioner (traditional Thai massager), granted by the Minister of Labour as follows:

1. Cancel the announcement of the Skills Development Promotion Committee on National Skills Standards, Thai traditional massage: *nuad* Thai, on 4 September 2006.

2. *Nuad* Thai practitioner (traditional Thai massager) means a person with expertise in Thai traditional medicine: Thai massage, depending on Thai traditional knowledge or textbooks that continuously transfer and develop, or study in the schools certified by the government.

3. The National Skills Standards, *nuad* Thai practitioner (Traditional Thai Massager) is divided into three levels:

3.1 Level 1 means a person with competency in massage or foot massage, contraindications and precautions, as well as good body-mind, according to the code of ethics and morals of *nuad* Thai practitioners (traditional Thai massager).

3.2 Level 2 means a person with competency in massage, foot massage, therapeutic massage, at least 10 common symptoms, contraindications, and precautions, as well as good body-mind, according to the code of ethics and morals of *nuad* Thai practitioners (traditional Thai massagers).

3.3 Level 3 means a person with competency in therapeutic massage and symptom diagnosis under the theory of Thai traditional medicine, contraindications, and precautions, as well as good body-mind, according to the code of ethics and morals of *nuad* Thai practitioners (traditional Thai massagers).

4. Technical requirements are knowledge, skill, and attitude measurement for professional *nuad* Thai practitioners (traditional Thai massagers) as follows:

National Skills Standards for Level 1

4.1 Knowledge: candidates must have knowledge and understanding of:

4.1.1 health science:

- (1) physiology and anatomy;
- (2) first aid; and
- (3) basic mental health;

4.1.2 Thai traditional medicine, ethics, and laws:

- (1) theories of basic Thai traditional medicine;
- (2) herbs for primary health care;
- (3) Thai-style exercises: *rue see dad tone*; and
- (4) ethics and laws;

4.1.3 Thai traditional massage:

- (1) history, study, and application of Thai massage;
- (2) ten main energy lines;
- (3) basic Thai massage; and
- (4) Thai massage for health.

4.2 Skills: candidates must have skills in:

- 4.2.1 morality and ethics;
- 4.2.2 personal space and precautions; and
- 4.2.3 massage for general pain symptoms or health relaxation.

4.3 Attitude includes accurate timekeeping, discipline, honesty, and economy.

National Skills Standards for Level 2

4.4 Knowledge: candidates must have knowledge and understanding of:

4.4.1 health science:

- (1) physiology and anatomy;
- (2) first aid;
- (3) basic mental health;
- (4) diagnosis for specific symptoms; and
- (5) basic knowledge of drugs;

4.4.2 Thai traditional medicine:

- (1) theories of Thai traditional medicine;
- (2) primary knowledge of Thai traditional pharmacology;
- (3) Thai-style exercises – *rue see dad tone* – for reliving symptoms; and
- (4) ethics and laws;

4.4.3 Thai traditional massage:

- (1) history, study, and application of Thai massage;
- (2) ten main energy lines and the causes of diseases;
- (3) basic Thai massage;

- (4) Thai massage for health;
- (5) Thai massage for relieving symptoms; and
- (6) recording massage results.

4.5 Skills: candidates must have skills in:

- 4.5.1 morality and ethics;
- 4.5.2 personal space and precautions;
- 4.5.3 massage for general pain or health relaxation;
- 4.5.4 massage for relieving the general pain of 10 symptoms:
 - (1) stress or headache;
 - (2) neck pain (non-abnormal skeletal and nervous systems);
 - (3) shoulder pain;
 - (4) back pain;
 - (5) hip pain;
 - (6) arm pain;
 - (7) elbow-wrist pain;
 - (8) leg pain;
 - (9) knee pain (non-inflammation and infection); and
 - (10) ankle pain (non-inflammation).

4.6 Attitude includes conceptual framework for developing knowledge, performing work, making decisions, resolving problems, and giving advice to the employees.

National Skills Standards for Level 3

4.7 Knowledge: candidates must have knowledge and understanding of:

- 4.7.1 health science:
 - (1) physiology and anatomy;
 - (2) first aid;
 - (3) basic psychology;
 - (4) assessment of painful symptoms;
 - (5) basic pharmacology; and

- (6) diseases and inspection of bones, joints, and muscles;

4.7.2 Thai traditional medicine:

- (1) philosophy of medicine;
- (2) theories of Thai traditional medicine;
- (3) introduction to Thai pharmacology; and
- (4) Thai-style exercises – *rue see dad ton* – for relieving symptoms and diseases in Thai massage;

4.7.3 Thai traditional massage:

- (1) history, study, and application of Thai massage;
- (2) ten main energy lines and the causes of diseases;
- (3) basic Thai massage;
- (4) Thai massage for health;
- (5) therapeutic Thai massage;
- (6) Thai massage for rehabilitation;
- (7) recording massage results;
- (8) Thai massage for athletes;
- (9) Thai massage for mothers and children; and
- (10) other massages: oil massage, foot massage for health, therapeutic foot massage, and Thai spa treatment;

4.7.4 Law, ethics, society, and language:

- (1) laws;
- (2) the national health system;
- (3) management;
- (4) activities to promote good work habits;
- (5) principles of communication;
- (6) English for careers;
- (7) medical information;
- (8) culture;
- (9) ethics; and

(10) meditation practice.

4.8 Skills: candidates must have skills in:

4.8.1 morality and ethics;

4.8.2 personal space and precautions;

4.8.3 massage for general pain or health relaxation;

4.8.4 massage for relieving general pain of 10 symptoms:

(1) stress or headache;

(2) neck pain (non-abnormal skeletal and nervous systems);

(3) shoulder pain;

(4) back pain;

(5) hip pain;

(6) arm pain;

(7) elbow-wrist pain;

(8) leg pain;

(9) knee pain (non-inflammation and infection); and

(10) ankle pain (non-inflammation);

4.8.5 massage for treatment for three groups:

(1) massage for treatment of 22 symptoms:

a) migraine or myofascial pain syndrome of head and neck;

b) myofascial pain syndrome of the C7 paraspinal muscle;

c) myofascial pain syndrome of the T1 paraspinal muscle;

d) frozen shoulder;

e) rotator cuff tendinitis or pericapsular bursitis;

f) lateral/medial epicondylitis;

g) traumatic arthritis;

h) trigger finger;

i) myofascial pain syndrome of the L3 paraspinal muscle;

j) myofascial pain syndrome of the L5 paraspinal muscle;

- k) cramping;
 - l) plantar fasciitis or calcaneal spur;
 - m) traumatic arthritis;
 - n) facial nerve palsy or Bell's palsy;
 - o) idiopathic ptosis;
 - p) partial radial nerve injury;
 - q) carpal tunnel syndrome;
 - r) partial peroneal nerve injury;
 - s) constipation;
 - t) fore ankle sprain;
 - u) lateral ankle sprain; and
 - v) procidentia uteri – first degree;
- (2) massage for relieving pain for eight symptoms:
- a) lumbosacral spondylitis;
 - b) lumbar spondylitis;
 - c) traumatic hip pain or osteoarthritis hip;
 - d) acute knee pain;
 - e) osteoarthritis knee;
 - f) chronic ankle pain;
 - g) erectile dysfunction; and
 - h) muscular dystrophy; and
- (3) massage for rehabilitation, and prevention of complication for three symptoms:
- a) Parkinson's disease;
 - b) hemiparesis/hemiplegia; and
 - c) cerebral palsy.

4.9 Attitude includes conceptual framework for analysing and planning, as well as resolving problems regarding effective work.

Announcement of the Skills Development Promotion Committee:
Qualifications of candidates for *nuad* Thai practitioner (traditional Thai massager)

According to section 22, third paragraph, of the Skills Development Promotion Act, 2002, the Skills Development Promotion Committee has specified the qualifications for candidates for *nuad* Thai practitioner (traditional Thai massager) as follows:

1. National Skills Standards, *nuad* Thai practitioner (traditional Thai massager) at Level 1:

1.1 Candidates must be at least 18 years old as of the date of application for the test.

1.2 Candidates must have knowledge of *nuad* Thai as follows:

1.2.1 must pass or be trained in a course for *nuad* Thai practitioner (traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government has guaranteed all courses, of no less than 150 hours; or

1.2.2 have graduated with at least a certificate for a *nuad* Thai practitioner for a course of no less than two years, or Thai traditional medicine for no less than three years, or applied Thai traditional medicine.

1.3 Candidates must have experience in *nuad* Thai practice, of no less than 100 client cases from the date of graduation.

1.4 Blind candidates must pass or be trained in a course for *nuad* Thai practitioner (traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government has guaranteed all courses, of no less than 225 hours, and have experience in *nuad* Thai practice of no less than 100 client cases from the date of graduation.

2. National Skills Standards, *nuad* Thai practitioner (traditional Thai massager) at Level 2.

2.1 Candidates must have knowledge of *nuad* Thai as follows:

2.1.1 must pass or be trained in a course for *nuad* Thai practitioner (traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government has guaranteed all courses, of no less than 330 hours; and the training course must include massage for relieving general pain in 10 symptoms, required by the National Skills Standards for *nuad* Thai practitioner (traditional Thai massager); or

2.1.2 have graduated with at least a certificate for a *nuad* Thai practitioner for a course of no less than two years, or Thai traditional medicine for no less than three years, or applied Thai traditional medicine

2.2 Candidates must have experience in *nuad* Thai practice as follows:

2.2.1 must have experience in *nuad* Thai practice of no less than 100 client cases, divided into massage for the health of clients in no less than 50 cases, and massage for relieving general pain in 10 symptoms of no less than 50 cases, from the date of certification in the National Skills Standards at Level 1;

2.2.2 must have a total score for the National Skills Standards test at Level 1 of no less than 80 per cent, without the experience according to item 2.2.1.;

2.3 Blind candidates must pass or be trained in a course for *nuad* Thai practitioner (traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government has guaranteed all courses, of no less than 495 hours, and have experience in *nuad* Thai practice of no less than 100 client cases, divided into massage for the health of clients of no less than 50 cases, and massage for relieving general pain in 10 symptoms, of no less than 50 cases.

3. National Skills Standards for *nuad* Thai practitioners (traditional Thai massager) at Level 3.

3.1 Candidates must have knowledge of *nuad* Thai as follows:

3.1.1 must pass or be trained in a course for *nuad* Thai practitioner (Traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government guaranteed all courses, of no less than 800 hours; or

3.1.2 must have graduated with at least a certificate in *nuad* Thai for a course of no less than two years, or Thai traditional medicine of no less than three years, or applied Thai traditional medicine.

3.2 Candidates must have a medical license in *nuad* Thai or Thai traditional medicine, or applied Thai traditional medicine.

3.3 Candidates must have experience in *nuad* Thai as follows:

3.3.1 must have experience in *nuad* Thai practice of no less than 100 client cases, divided into massage for the health of clients of no less than 30 cases, and therapeutic massage for relieving symptoms of no less than 70 cases, including no less than 50 per cent of the diseases required by the National Skills Standards for *nuad* Thai practitioner (traditional Thai massager) from the date of certification at Level 2; or

3.3.2 must have a total score for the National Skills Standards test at Level 2 of no less than 80 per cent, without the experience according to item 3.3.1.

3.4 Blind candidates must pass or be trained in a course for *nuad* Thai practitioner (traditional Thai massager) at a public or private educational institute, or public agency, or other organization for which the government has guaranteed all courses, of no less than 1,200 hours, and have experience in *nuad* Thai practice of no less than 100 client cases, divided into massage for the health of clients of no less than 30 cases, and therapeutic massage for relieving symptoms of no less than 70 cases, include no less than 50 per cent of the diseases required by the national skills standards for *nuad* Thai practitioner (traditional Thai massager) as from the date of certification at Level 2.

Announcement of the Skills Development Promotion Committee

National Skills Standards: bartender

According to section 22, first paragraph, the Skills Development Promotion Act 2002, the Skills Development Promotion Committee has issued the National Skills Standards for bartender, granted by the Permanent Secretary of the Ministry of Labour as follows:

1. In this announcement, “bartender” means an individual assigned to prepare and mix beverages for customers in the service and beverages business.

2. The National Skills Standards for bartender are divided into three levels:

2.1 Level 1. “Bar helper” means an individual who helps with work in the bar and is not responsible for mixing and serving beverages.

2.2 Level 2. “Bartender” means an individual who is responsible for preparing and mixing beverages in accordance with standards and techniques.

2.3 Level 3. “Bar supervisor/captain” means an individual who monitors bartenders and is responsible for organizing all activities involving the preparation and mixing of beverages, as assigned.

Factors used to assess the knowledge, skills, and attitudes of bartenders are as follows:

National Skills Standards for Level 1

3.1 Knowledge consists of knowledge and understanding of the following:

3.1.1 basic English knowledge;

3.1.2 bar tools, equipment, and consumables:

(1) types and usage of bar tools, equipment, and consumables; and

(2) wares and consumables;

3.1.3 bar operation:

(1) scope of bar operation;

(2) types of bar operation; and

(3) relationship between the bar operation and the establishment;

3.1.4 bar set-up:

(1) bar opening and closing procedure;

(2) preparation and setting up of different types of beverages;

(3) preparation of equipment;

(4) preparation of garnishes;

(5) consumables for customers; and

(6) *mise en place*;

3.1.5 mathematics and control procedures:

- (1) addition, subtraction, multiplication, and division;
- (2) percentages;
- (3) ratios, proportions, and volumes; and
- (4) par stock;

3.1.6 safety management:

- (1) regular safety practices;
- (2) fire control and prevention;
- (3) first aid; and
- (4) handling of tools, equipment, and consumables;

3.1.7 personality development:

- (1) personal grooming and hygiene;
- (2) relationships at work; and
- (3) ethics and manners; and

3.1.8 hotel and restaurant operation:

- (1) hotel and restaurant organizational structures; and
- (2) rules and regulations for employees.

3.2 Skills consist of capability in the following parameters:

3.2.1 basic English knowledge;

3.2.2 observing safety and sanitation practices:

- (1) handling tools and equipment;
- (2) using protective devices;
- (3) fire prevention and control; and
- (4) bar maintenance procedures;

3.2.3 bar set-up:

- (1) preparing ice supplies;

- (2) chilling beer;
- (3) setting up bar displays;
- (4) preparing alcoholic and non-alcoholic beverages;
- (5) preparing bar tools and equipment;
- (6) preparing garnishes;
- (7) preparing glass supplies;
- (8) installing draft beer and soda dispensers; and
- (9) preparing bar supplies for customers;

3.2.4 cleaning the bar area:

- (1) cleaning the bar counter area;
- (2) cleaning the bar floor area;
- (3) cleaning the sink area;
- (4) cleaning the cabinet area;
- (5) cleaning the stock room area; and
- (6) disposing of empty bottles and containers;

3.2.5 cleaning bar tools and equipment:

- (1) cleaning bar tools;
- (2) washing and drying glasses;
- (3) washing and drying shakers;
- (4) washing and drying blenders;
- (5) cleaning the ice buckets;
- (6) cleaning the ice bins;
- (7) cleaning the chillers;
- (8) cleaning the glass washers; and
- (9) cleaning the ash trays; and

3.2.6 closing the bar:

- (1) keeping bar tools and equipment;

- (2) keeping bar displays;
- (3) keeping unused items;
- (4) closing beer taps and soda dispensers;
- (5) turning off lights in the bar; and
- (6) returning keys.

3.3 Attitude includes punctuality, discipline, honesty, and cost-concern.

National Skills Standards for Level 2

3.4 Knowledge consists of knowledge and understanding of the following:

3.4.1 English for bartenders;

3.4.2 product knowledge:

- (1) classifying beverages and wines;
- (2) wines' countries of origin;
- (3) food and wine combinations; and
- (4) bar terminology;

3.4.3 wine storage:

- (1) basic knowledge of proper wine storage; and
- (2) basic inventory management;

3.4.4 mixing drinks:

- (1) methods and procedures for mixing drinks;
- (2) standard drink recipes; and
- (3) different garnishes;

3.4.5 serving basic beverages and wine:

- (1) basic serving procedures;
- (2) opening and serving wines; and
- (3) dos and don'ts in serving beverages;

3.4.6 bar stock maintenance:

- (1) preparation of beverage stock checking;
- (2) preparation of beverage requisition;

- (3) preparation of beverage equipment requisition;
- (4) preparation of perishable materials requisition;
- (5) preparation of requisition from stores;
- (6) preparation of bar tools and equipment requisition;
- (7) obtaining requisite items for the bar;
- (8) preparation of inter-bar transfer form;
- (9) inventory checking for bar tools and equipment; and
- (10) daily sales summary;

3.4.7 beverage sales:

- (1) categorizing products for sale;
- (2) categorizing drinks appropriate for different occasions; and
- (3) suggestive selling techniques.

3.5 Skills consist of capability in the following parameters:

3.5.1 English for bartenders;

3.5.2 mixing drinks:

- (1) mixing high ball drinks;
- (2) mixing long or tall drinks;
- (3) mixing cocktails;
- (4) mixing special coffee brews; and
- (5) mixing non-alcoholic drinks;

3.5.3 serving at the bar counter:

- (1) serving non-alcoholic drinks; and
- (2) serving alcoholic drinks; and

3.5.4 beverage payment:

- (1) checking order slips;
- (2) preparing order slips; and
- (3) collecting payment from customers at the counter.

3.6 Attitude includes concepts on knowledge development, analysis, decision-making, problem-solving, and giving advice to subordinates.

National Skills Standards for Level 3

3.7 Knowledge consists of knowledge and understanding of the following:

3.7.1 advanced English for bar supervisors;

3.7.2 communication and documentation:

- (1) giving oral and written instructions;
- (2) verbal communication;
- (3) handling customer complaints;
- (4) images and charts;
- (5) reporting of spoilage items;
- (6) reporting of breakages and loss items; and
- (7) maintenance service requests;

3.7.3 creating new drinks:

- (1) cost and selling price calculation;
- (2) conducting staff meetings;
- (3) planning staff working schedules; and
- (4) sales promotions.

3.8 Skills consist of capability in the following parameters:

3.8.1 advanced English for bar supervisors;

3.8.2 communication and documentation:

- (1) giving oral and written instructions;
- (2) verbal communication;
- (3) handling customer complaints;
- (4) images and charts;
- (5) reporting of spoilage items;
- (6) reporting of breakages and loss items; and
- (7) maintenance service requests;

- 3.8.3 creating new drinks;
- 3.8.4 cost and selling price calculations;
- 3.8.5 conducting staff meetings;
- 3.8.6 planning staff working schedules; and
- 3.8.7 sales promotions.

3.9 Attitude includes concepts on planning analysis and problem-solving regarding efficiency and effectiveness.

Announced 10 February 2010.

Somchai Chumrat.

Permanent Secretary of the Ministry of Labour.

Chairman of the Skills Development Promotion Committee.

Appendix II: Skill gaps and weaknesses

Construction occupations

1. Bricklayer	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages ¹⁴	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue ¹⁵	The document does not explicitly state issues related to social dialogue.
Social protection ¹⁶	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
2. Computer-aided designer	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
3. Concrete tile roofer	Skills gaps/weakness

¹⁴ Thailand introduced a nationwide minimum wage in January 2013.

¹⁵ UNEP, ILO, IOE, ITUC, *Green Jobs*. Social dialogue is seen as an important component, especially at work. It refers to the input of the worker/union "...to help determine the design of new sustainable production systems and work practices. These committees could work to identify ways to improve energy efficiency, more efficient use of water and other natural resources and raw materials, and low-carbon work schedules" (2008, p. 27).

¹⁶ Includes "income protection as well as adequate retraining and educational opportunities and, where necessary, resources for relocation". (2008, p. 308)

Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document covers issues related to the safe and frugal use of tools, equipment and materials. No clear mention of sustainability.

4. Carpenter	Skills gaps/weakness
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Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document covers issues related to the safe and sustainable use of tools, equipment, and materials. The document does not explicitly state issues related to mitigation, adaptation, and sustainability.

5. Painter	Skills gaps/weakness
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Preservation and restoration of environmental quality	The document states issues related to preservation and restoration of environmental quality, but it is limited in detail.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection

Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation, but considers issues related to the disposal of paints in the correct manner.
6. Plumber	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
7. Electrician	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
8. Plasterer	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.

Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.

Tourism occupations

1. Room attendant	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
2. Baker	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
3. Thai cook	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.

Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
4. Front desk receptionist	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
5. Thai masseur	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.
Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.
6. Bartender	Skills gaps/weakness
Preservation and restoration of environmental quality	The document does not explicitly state issues related to preservation and restoration of environmental quality.
Decent work	
Adequate wages	The document does not explicitly state adequate wage levels. It is assumed that workers are paid according to the Thai minimum wage legislative standards.
Safe conditions	The document contains elements of occupational, health, and safety standards that need to be adhered to and are part of the training requirements.

Workers' rights	The document does not explicitly state issues related to workers' rights.
Social dialogue	The document does not explicitly state issues related to social dialogue.
Social protection	The document does not explicitly state issues related to social protection.
Mitigation and adaptation	The document does not explicitly state issues related to mitigation and adaptation.

Appendix III: Green competencies¹⁷for priority occupations – construction and tourism

Unit: (1) To be determined.

Unit code: To be determined.

Title and definition: Green bricklayer.

According to the Thai National Skills Standards, a bricklayer is defined as a person who has knowledge, competence, and skill in laying bricks or any cube material of a similar shape for construction, decoration, and repairing, by laying them vertically. To become a “green bricklayer”, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor

This unit of competency specifies the outcomes required to work as a “green bricklayer” in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of “green sustainable skills” must be applied in accordance with relevant Thai legislative and industry standards.

¹⁷ These competencies have been created using the CPC08 Construction, Plumbing, and Services Training Package, released 8, 13 April 2013, pp. 388-392; SIT12 Tourism, Travel, and Hospitality Training Package, pp. 233-237, and NCS, 2005.

Employability skills

Communication	<p>Makes suggestions for improved sustainable workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers/supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply sustainable environmental information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects before commencing work.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action or reports to managers or supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes use of resources by recycling, re-using, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, or equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Complies with Thai regulations and prepares for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seeks opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensures clean-up procedures are correctly adhered to.	<p>Work area is cleared and waste materials disposed of, reused, or recycled in accordance with regulations.</p> <p>Plant, tools, and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard work practices.</p> <p>Tools and equipment cleaned, maintained, and stored in safe locations.</p> <p>Unused materials safely stacked, stockpiled, or stored.</p>

Ensures waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Waste is disposed of in a safe manner without posing risk to third parties.</p> <p>Site is cleaned and cleared of debris and unwanted materials.</p> <p>Rubbish is deposited in designated rubbish disposal bins and according to regulatory specifications, and chemicals and noxious products are safely stored, catalogued, and safely handled.</p>
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Evidence guide

Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instruction, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste matter; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Bolsters, brick grabs, buckets, builders' squares, builders' lines, concrete mixers, dump levels, elevators, hammers, hoses, jointing tools, line blocks, line pins, masons' squares, masonry saws, measuring tapes and rules, mortar boards, plumb rules, margin or raking tools, profiles, shovels, spirit levels, straight edges, string lines, trowels, wheelbarrows, small petrol or diesel engines, compressors, and mixers.
Materials include:	Aggregates; cement; clay bricks; lime; masonry blocks; reinforcing materials; steel, aluminium and timber window frames; timber and steel door frames; waterproofing materials.
Thai regulations, compliance, information, and documents include:	Thai occupational health and safety (OH&S) and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise, waste disposal and reprocessing, handling of dangerous goods and hazardous substances, and other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing, handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (2) To be determined.

Unit code: To be determined.

Title and definition: Green computer-aided designer (green-CAD).

According to the Thai National Skills Standards, a computer-aided designer is a person having knowledge, competence, and skill in drawing plans for constructions with basic tools and equipment, and computers as assigned by the supervisor, engineers, and architects. To become a “green CAD”, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green-CAD in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects. Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including offices, tools, and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at the office workplace and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals and pollutants do not pollute the work environment and office and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of the office and workplace equipment in order to not pollute the workplace and adjacent environment.</p> <p>Office equipment is operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of office equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Office worksites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and office managers.</p> <p>Material quantity requirements are calculated in accordance with workplace sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p> <p>Sustainable materials are purchased according to regulations and instructions by office managers.</p> <p>Office material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental practices are followed, which include office waste minimization, and use of sustainable office products, etc.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Work area is cleared and waste materials disposed of, reused, or recycled in accordance with waste and pollution minimization.</p> <p>Office equipment is cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard CAD workplace practices.</p> <p>Office files are stored in safe locations.</p> <p>Unused materials are safely stacked, stockpiled, and stored.</p>

Ensure waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed in a manner that minimizes environmental damage or is neutral to the office environment.</p> <p>Waste is disposed in a safe manner without posing risk to third parties.</p> <p>Site is cleaned and cleared of debris and unwanted materials.</p>
Prepare to use CAD computer applications.	<p>Environmentally sustainable procedures for a given work area are identified, obtained, and understood through established routines and procedures.</p> <p>Established OHS risk control measures and procedures in relation to computer and keyboard use are followed.</p> <p>Information required for the use of the application is obtained from appropriate sources.</p> <p>Computer is started up and desktop icons are manipulated to access desired application, directories, and files.</p> <p>On-screen instructions in relation to any anomaly such as a virus warning are followed.</p> <p>Help directory is used to resolve any straightforward start-up or access issues or anomalies.</p>

Evidence guide

Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the office workplace.</p>

Required skills and knowledge

Required knowledge	
Preservation and restoration of environmental quality	
<ul style="list-style-type: none"> • Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace. • Basic knowledge on procedures to limit greenhouse gas emissions in the workplace. • Basic knowledge on how best to minimize waste and pollution in the workplace. • Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable. 	
Decent work	
<ul style="list-style-type: none"> • Knowledge of Thai laws and regulations relevant to the work context. • Site layout, including location of rubbish disposal bins, is clearly understood. • Application of relevant environmental protection regulations and requirements. • Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace. 	
Mitigation and adaptation	
<ul style="list-style-type: none"> • Workplace procedures and guidelines for the care of the environment at work. • Environmental risks and protection standards are adhered to when carrying out workplace operations. • Procedures and processes for waste and effluent regulation where applicable. 	
Required skills	

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small office sites in the building industry; majority of work indoors, but may be outdoors; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and pollutants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; office and site visitors; contractors; and clients.
Tools and equipment may include:	Resource requirements may include: computer software, environmentally friendly stationary, software reference documentation, reference texts, consumables, computers, printing equipment, and printing cartridges and inks.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (3) To be determined.

Unit code: To be determined.

Title and definition: Green plasterer.

According to the Thai National Skills Standards, a plasterer is a person who has knowledge, competency, and skill in plastering, coating, repairing plaster, pasting, and selecting and preparing accessories appropriate to task requirements. To become a “green” plasterer, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green plasterer in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved workplace sustainability processes, and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, and equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Work area is cleared and batten materials and fasteners are disposed of, reused, or recycled in accordance with Thai legislation, regulations, codes of practice, and job specifications.</p> <p>Hazardous material is identified for separate handling.</p> <p>Non-toxic materials are removed using correct procedures.</p> <p>Dust suppression procedures are used to minimize health risks to work personnel and others.</p> <p>Tools and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard work practices.</p>

Ensure waste disposal procedures are followed.

Waste is disposed of using appropriate sustainable procedures.

Waste is disposed in a manner that minimizes environmental damage or is neutral to the environment.

Waste is disposed of in a safe manner without posing risks to third parties.

Site is cleaned and cleared of debris and unwanted materials.

Evidence guide

Overview of assessment

A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.

Method of assessment

Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
-

Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Broad knives, brooms, electric screw guns, hand and power drills, hand saws, keyhole saws, measuring tapes and rules, paintbrushes, plasterboard hammers, plasterers' trowels, scaffold planks, T-squares, taping knives, and trestles.
Materials include:	Beads, cement render, fibre cement sheets, finishing materials, plaster compounds, plasterboard, plasterglass sheets, and water resistant plasterboard.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (4) To be determined.

Unit code: To be determined.

Title and definition: Green concrete tile roofers.

According to the Thai National Skills Standards, concrete tile roofers are those who have knowledge, competence, and skill in roofing concrete tiles, based on the standard industry tiles. To become a green concrete tile roofer, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green concrete tile roofer in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved workplace sustainability processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organising	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, and equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Worksites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Roof, guttering, and downpipes are cleared free of waste and surplus material.</p> <p>Work areas are cleared and materials disposed of, reused, or recycled, in accordance with legislation, regulations, codes of practice, and Thai job specifications.</p> <p>Plant, tools, and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and Thai standard work practices.</p> <p>Dust suppression procedures are used to minimize health risk to work personnel and others.</p>

Ensure waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Waste is disposed of in a safe manner without posing risks to third parties.</p> <p>Site is cleaned and cleared of debris and unwanted materials.</p>
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Evidence guide

Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
-

Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
-

Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Bedding frames; blowers; brooms; buckets; calculators; chisels; concrete mixers; elevators; embossing mallets; fall safety devices; gutter protectors; hammers; hand saws; high-pressure water cleaners; ladders; measuring tapes and rules; nail bags; nail guns; pincers; power drills; power leads; power saws; shovels; squares; string and chalk lines; tile cutters; trowels; blocks; breaks or cutting irons; guillotines; rippers; scaffolds; slate cutters; slate reefers; slaters' hammers; slating knives; small compressors; and small petrol or diesel engines.
Materials include:	Adhesives; concrete and terracotta tiles; fastenings and other mechanical fixings; flashings; mortar; sarking materials; timber and metal battens; flexible pointing materials; lead; shingles and other hand manufactured products; and slate.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (5) To be determined.

Unit code: To be determined.

Title and definition: Green construction carpenter.

According to the Thai National Skills Standards, construction carpenters are those who have knowledge, competence, and skills in construction with different types of wood. To become a green construction carpenter, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green construction carpenter in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved workplace sustainability processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize energy usage and air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, and equipment is avoided to minimize air and noise pollution of the environment.</p> <p>Worksites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Work area is cleared and materials disposed of, reused, or recycled in accordance with legislation, regulations, codes of practice, and job specifications.</p> <p>Hazardous materials are identified for separate handling.</p> <p>Non-toxic materials are removed using correct procedures.</p> <p>Dust suppression procedures are used to minimize health risks to work personnel and others.</p> <p>Tools and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard work practices.</p>

Ensure waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Waste is disposed of in a safe manner without posing risks to third parties. Site is cleaned and cleared of debris and unwanted materials.</p>
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Evidence guide

Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
-

Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Air compressors and hoses; bevels; chisels; hammers; hand saws; marking equipment; measuring tapes and rules; nail bags; nail guns; power drills; power saws and power leads; protractors; saw stools; scaffolding; spirit levels; squares (combination/tri); stair clips and tables; steel squares and fence; and string lines.
Materials include:	Bolts and nails; patented fasteners; screws; timber; glass; insulation; joinery units; metal sheeting; paints and sealants; plaster or fibre cement sheeting; reconstituted timber products; reinforcement materials; scaffolding components; and structural steel sections and components.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (6) To be determined.

Unit code: To be determined.

Title and definition: Green painter.

According to the Thai National Skills Standards, painters are those who have knowledge, competence, and skill in painting for decoration, and they shall have skills in preparing different surfaces to apply coats of paint to. To become a green painter, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green painter in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource-efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved workplace sustainability processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximises use of resources by recycling, re-using or using appropriate disposal methods and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.

Workplace environmental and resource efficiency issues are identified.

Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.

Routine checks are conducted or organized to ensure a clean workplace environment is present.

Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.

Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.

Unnecessary running of tools, engines, and equipment is avoided to minimize energy usage and air and noise pollution of the environment.

Worksites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.

Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Hazardous materials are identified for handling by authorized personnel.</p> <p>Work area is cleared and material disposed of in a safe and effective manner, in accordance with Thai regulations and requirements.</p> <p>Unused materials are sealed, stored, and stacked in accordance with standard material handling practices, and in a safe place.</p> <p>Non-paint waste materials and debris are removed and placed into job waste bins or rubbish stockpiles in a safe and effective manner, in accordance with environmental requirements.</p> <p>Paint waste, water, and solvents used in cleaning painting equipment are disposed of in an environmentally sustainable manner, and in accordance with relevant Thai legislative requirements.</p> <p>Likelihood of spontaneous combustion is identified and suitable protective measures are applied. Protective gear is used at all times.</p> <p>Tools and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations, environmental sustainability requirements, and standard work practices.</p>
Ensure waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Waste is disposed of in a safe manner without posing risks to third parties.</p> <p>Site is cleaned and cleared of debris and unwanted materials.</p>
Evidence guide	
Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly</p>

relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.

Method of assessment

Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
-

Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Cleaning solvents; coatings; fillers and adhesives; wall and decorative covering materials; barricades; covering; lock away (for hazardous materials); and signs.
Materials include:	Low-odour and low-VOC (volatile organic compound) paint; non-VOC paint; non-toxic paint; alternative and natural paint and paint materials; brush ware; natural bristle; nylon; microcellular synthetic bristles; water-based; solvent-based; two-pack; and textures.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (7) To be determined.

Unit code: To be determined.

Title and definition: Green plumber.

According to the Thai National Skills Standards, plumber means an individual with knowledge and skills to assemble, install, fix, maintain, and examine different building pipe systems. To become a green plumber, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green plumber in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction sites and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, and equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Hazardous material are identified for handling by authorized and cognizant personnel.</p> <p>Work area is cleared and material disposed of in a safe and effective manner, in accordance with Thai regulations and requirements.</p> <p>Unused materials are sealed, stored, or stacked in accordance with standard material handling practices, and in a safe place.</p> <p>Tools and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard work practices.</p> <p>Documentation is completed according to workplace requirements and according to Thai laws.</p>

Ensure waste disposal procedures are followed.

Waste is disposed of using appropriate sustainable procedures.

Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.

Waste is disposed of in a safe manner without posing risks to third parties.

Site is cleaned and cleared of debris and unwanted materials.

Evidence guide

Overview of assessment

A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.

Method of assessment

Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimise waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
-

Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
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- Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Broad knives; caulking guns; electric screw guns; letting boxes; hammers; manual levelling devices; measuring tapes and rules; nail bags; power drills; power leads; power saws; screw guns; spanners; spirit levels; squares; tin snips; trestles; trowels; C-clamps; air compressors and hoses; docking saws and drop saws; laser levelling devices; masonry drills; nail guns; pop riveters; saw stools; and system scaffolding and planks.
Materials include:	Gases; liquids; solids.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (8) To be determined.

Unit code: To be determined.

Title and definition: Green electrician.

According to the Thai National Skills Standards, electrician means a worker in the field of installing electrical power systems. To become a green electrician, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green electrician in the construction industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai construction industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities, and maximizes use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution at construction site and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, fuels, and lubricants do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of equipment, tools, machinery, and vehicles in order to not pollute the workplace and adjacent environment.</p> <p>Site machinery, mechanical tools, equipment, and vehicles are operated efficiently to minimize air and noise pollution, excessive exhaust emissions, and potential noxious spills.</p> <p>Unnecessary running of tools, engines, and equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and site manager.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Hazardous materials are identified for handling by authorized and cognizant personnel.</p> <p>Work area is cleared and material disposed of in a safe and effective manner, in accordance with Thai regulations and requirements.</p> <p>Unused materials are sealed, stored, or stacked in accordance with standard material handling practices, and in a safe place.</p> <p>Tools and equipment are cleaned, checked, maintained, and stored in accordance with manufacturer recommendations and standard work practices.</p> <p>Documentation is completed according to workplace requirements and according to Thai laws.</p>

Waste disposal

Waste is disposed of using appropriate sustainable procedures.

Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.

Waste is disposed of in a safe manner without posing risks to third parties.

Site is cleaned and cleared of debris and unwanted materials.

Evidence guide

Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.
Method of assessment	Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge	
Preservation and restoration of environmental quality	<ul style="list-style-type: none">• Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.• Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.• Basic knowledge on how best to minimise waste and pollution in the workplace.• Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
Decent work	<ul style="list-style-type: none">• Knowledge of Thai laws and regulations relevant to the work context.• Site layout, including location of rubbish disposal bins, is clearly understood.• Application of relevant environmental protection regulations and requirements.• Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
Mitigation and adaptation	<ul style="list-style-type: none">• Workplace procedures and guidelines for the care of the environment at work.• Environmental risks and protection standards are adhered to when carrying out workplace operations.• Procedures and processes for waste and effluent regulation where applicable.
Required skills	
Preservation and restoration of environmental quality	<ul style="list-style-type: none">• Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.• Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.• Able to identify and implement procedures that minimize waste and pollution in the workplace.• Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
Decent work	<ul style="list-style-type: none">• Communicate effectively to recognize procedures, follow instructions, and respond to changes.• Work collaboratively with others when caring for the environment.
Mitigation and adaptation	<ul style="list-style-type: none">• Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.• Implement contingency plans for unanticipated situations that may occur when caring for the environment.• Recognize potential pollution risks and ways of minimizing them.• Follow routine service and maintenance procedures for equipment and vehicles.

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small construction sites in the building industry; indoor and outdoor; clean-up protection; dust management techniques; noise management techniques; vibration management techniques; waste management; exhaust fumes; oils and lubricants; gas and smoke; chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; contractors; and clients.
Tools and equipment may include:	Crimping tools; wire cutters; tool boxes; wires strippers; conduit cutters; high-voltage cutters; wire pullers; cabling systems; tool sets; and torches.
Materials include:	Metallic conduits; non-metallic conduits; trunking; ducts; cable trays and ladders; catenary; posts, poles, and struts; thermoplastic insulated cable (TPI); flat thermoplastic sheathed (TPS); circular thermoplastic sheathed (TPS); steel wire armoured (SWA); fire-rated cable (HT or HF or MIMS); flexible cables; and aerial cable.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; policies and procedures for entry and work in confined spaces; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (1) To be determined

Unit code: To be determined

Title and definition: Green room attendant

According to the Thai National Skills Standards, a room attendant is a person responsible for cleaning guest rooms, and carries out tasks to facilitate and assist the hotel guests according to the prescribed standards. To become a green room attendant, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green room attendant in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from hotel customers, and site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply sustainability environmental information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities, and maximizes use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques, related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution in the workplace and adjoining areas.	<p>Workplace environmental and resource-efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, detergents, and cleaning materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Suitable precautions are taken during the cleaning of rooms in order to not pollute the workplace and adjacent environment.</p> <p>Cleaning equipment is operated efficiently to minimize air and noise pollution and potential damage to the environment.</p> <p>Unnecessary running of equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable materials are purchased according to regulations and instructions by supervisors and area managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning tasks.</p> <p>Check that equipment is clean and in safe working condition before use.</p> <p>Select and prepare suitable wet and dry cleaning agents according to manufacturer instructions, and work to health and safety and environmental requirements.</p> <p>Select and use sustainable protective clothing where necessary.</p> <p>Tools and equipment cleaned, maintained, and stored in safe locations.</p> <p>Unused materials safely stacked, stockpiled, or stored.</p>

Ensure waste disposal procedures are followed.

Waste is disposed of using appropriate sustainable procedures.

Waste is disposed in a manner that minimizes environmental damage or is neutral to the environment.

Waste is disposed of in a safe manner without posing risks to third parties.

Site is cleaned and cleared of debris and unwanted materials.

Rubbish is deposited in designated rubbish disposal bins and according to regulatory specifications, and chemicals and noxious products are safely stored, catalogued, and safely handled.

Select and apply correct cleaning agents or chemicals for specific areas, surfaces, and equipment, according to manufacturer recommendations, and safety and organizational procedures.

Avoid unhygienic personal contact with food or food contact surfaces.

Avoid unhygienic cleaning practices that may cause illnesses.

Evidence guide

Overview of assessment

A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.

Method of assessment

Assessment should occur:
through appropriately simulated activities at the registered training organization; or
in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
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- Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:

Large, medium, or small hotel or holiday lodgings in the tourism and hospitality industry; indoor; clean-up protection; dust management techniques; noise management techniques; waste management; cleaning chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; site visitors; and hotel and holiday lodging guests. Wet and dry areas may include: balconies; bathrooms; bedrooms; function rooms; kitchens; private lounge areas; public areas; and storage areas.

Tools and equipment may include:

Electrically operated equipment: polishers; scrubbers; vacuum cleaners; garbage receptacles. Manual equipment: brushes; buckets; dusters; mops and cloths. Protective clothing may include: aprons; breathing apparatus; gloves; goggles and masks; headwear; jackets; overalls; waterproof clothing, and footwear.

Materials include:

Cleaning agents may include: substances for specialized surfaces such as glass and wood, deodorizers, disinfectants, spot cleaning chemicals, and pesticides.

Thai regulations, compliance, information, and documents include:

Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Suggestions may include ideas that help to:

Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.

Information and documents may include:

OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (2) To be determined.

Unit code: To be determined.

Title and definition: Green baker.

According to the Thai National Skills Standards, a baker is a person with knowledge, skills, and ability regarding the preservation of bread, equipment, and ingredients, as well as abiding to usage procedures correctly and safely. To become a green baker, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green baker in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource-efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from hotel customers, site managers, and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques, related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution in the workplace and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, detergents, and cleaning materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean workplace environment is present.</p> <p>Cleaning equipment is operated efficiently to minimize air and noise pollution and potential damage to the environment.</p> <p>Unnecessary running of equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable ingredients are purchased according to regulations and instructions by supervisors and managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning tasks.</p> <p>Check that equipment is clean and in safe working condition before use.</p> <p>Select and prepare suitable wet and dry cleaning agents according to manufacturer instructions, and work, health, safety, and environmental requirements.</p> <p>Select and use sustainable protective clothing where necessary.</p> <p>Tools and equipment are cleaned, maintained, and stored in safe locations.</p> <p>Unused ingredients are safely stacked, stockpiled, or stored.</p> <p>Equipment is cleaned to meet production and hygiene requirements</p> <p>Cleaning is conducted in accordance with workplace environmental guidelines.</p>

Ensure waste disposal procedures are followed.

Waste is disposed of using appropriate sustainable procedures.

Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.

Waste is disposed of in a safe manner without posing risks to third parties.

Site is cleaned and cleared of debris and unwanted materials.

Rubbish is deposited in designated rubbish disposal bins and according to regulatory specifications, and chemicals and noxious products are safely stored, catalogued, and handled.

Select and apply correct cleaning agents or chemicals for specific areas, surfaces, and equipment, according to manufacturer recommendations, and safety and organizational procedures.

Avoid unhygienic personal contact with food or food contact surfaces.

Avoid unhygienic cleaning practices that may cause illnesses.

Evidence guide

Overview of assessment

A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.

Method of assessment

Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
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- Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small bakery; indoor; clean-up protection; dust management techniques; noise management techniques; waste management; cleaning chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; and site visitors.
Tools and equipment may include:	Mixers; sieves; weighing, metering, and lifting equipment; final provers; tins; slippers; trays; and sole of the oven.
Typical ingredients include:	Wheat flour; water; salt; yeast; shortenings; bread improvers; and additional ingredients such as rye flour, sours, fruit, spices, grains, and fibre
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information/documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (3) To be determined.

Unit code: To be determined.

Title and definition: Green Thai cook.

According to the Thai National Skills Standards, a Thai cook is a person who is responsible for preparing and cooking Thai food, including savories, desserts, and snacks, following agreed methods of Thai style cooking. To become a green Thai cook, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green Thai cook in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from site managers and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines cooking tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution in the workplace and adjoining areas.	<p>Workplace environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure chemicals, detergents, and kitchen cleaning materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean kitchen and workplace environment is present.</p> <p>Cleaning equipment is operated efficiently to minimize air and noise pollution and potential damage to the environment.</p> <p>Unnecessary running of kitchen equipment is avoided to minimize energy usage and air and noise pollution of the environment.</p> <p>Kitchen and work sites are kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Work processes are followed to ensure compliance.</p> <p>Sustainable ingredients are purchased according to regulations and instructions by supervisors and managers.</p> <p>Material quantity requirements are calculated in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to workplace practices in own work area.</p> <p>Workplace practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt workplace policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting workplace resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning tasks.</p> <p>Check that equipment is clean and in safe working condition before use.</p> <p>Select and prepare suitable wet and dry cleaning agents according to manufacturer instructions, and work, health, safety, and environmental requirements.</p> <p>Select and use sustainable protective clothing where necessary.</p> <p>Tools and equipment are cleaned, maintained, and stored in safe locations.</p> <p>Unused ingredients are safely stacked, stockpiled, or stored.</p> <p>Equipment is cleaned to meet production and hygiene requirements.</p> <p>Cleaning is conducted in accordance with workplace environmental guidelines.</p>

Ensure waste disposal procedures are followed.	<p>Waste is disposed of using appropriate sustainable procedures.</p> <p>Waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Waste is disposed of in a safe manner without posing risks to third parties.</p> <p>Site is cleaned and cleared of debris and unwanted materials.</p> <p>Rubbish is deposited in designated rubbish disposal bins and according to regulatory specifications, and chemicals and noxious products are safely stored, catalogued, and handled.</p> <p>Select and apply correct cleaning agents or chemicals for specific work areas, surfaces, and equipment, according to manufacturer recommendations, and safety and organizational procedures.</p> <p>Avoid unhygienic personal contact with food or food contact surfaces.</p> <p>Avoid unhygienic cleaning practices that may cause illnesses.</p> <p>Maintain environmental conditions for specific food types, to ensure freshness, quality, and appearance.</p>
Evidence guide	
Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
-

Range statement

Workplace environmental resource issues and requirements may include:	Large, medium, or small kitchen; indoor/outdoor; clean-up protection; hygiene management techniques; waste management; cleaning chemicals and detergents; rubbish and effluent; noise; waste material; workplace personnel; and site visitors.
Tools and equipment may include:	Barbecues; charcoal grills; cooking ranges; cutting, chopping, and slicing implements; food processors; knives; microwaves; mincers; roasting drums; sharpening steels and stones; steamers; strainers; ovens; utensils; woks; cutting, chopping and slicing implements; grills and griddles; mortar and pestle; pans; and stone grinders.
Typical ingredients include:	Condiments; eggs; flour products; herbs and spices; poultry; meats; seafood; rice; vegetables; and specific ingredients for particular Thai and other Asian dishes and cuisines.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning hygiene and food handling; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal; environmental conditions such as temperature, humidity, ventilation, and use of containers, etc.; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (4) To be determined.

Unit code: To be determined.

Title and definition: Green hotel front desk clerk/receptionist.

According to the Thai National Skills Standards, a front desk clerk/receptionist means an individual responsible for check-in and check-out processes for hotels, resorts, and other tourist accommodation and premises. To become a green front desk clerk/receptionist, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green front desk/receptionist in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from hotel customers, site managers, and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply environmental sustainability information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities, and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery, tools, etc.) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution in the workplace and adjoining areas.	<p>Front desk and work site environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure front desk and work site equipment and materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean front desk and work site environment is present.</p> <p>Cleaning equipment is operated efficiently to minimize air and noise pollution and potential damage to the front desk and work site environment.</p> <p>Unnecessary running of equipment is avoided to minimize energy usage and air and noise pollution of the front desk and work site environment.</p> <p>Front desk and work site is kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Front desk and work site processes are followed to ensure compliance.</p> <p>Sustainable material and equipment is purchased according to regulations and instructions by supervisors and managers.</p> <p>Material and equipment quantity requirements are used in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to front desk and work site practices in own work area.</p> <p>Front desk and work site practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt front desk and work site policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting front desk and work site resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning and maintenance of the front desk and work site.</p> <p>Check that front desk and work site equipment is clean and in safe working condition before use.</p> <p>Front desk and work site equipment is cleaned and maintained to meet hygiene requirements</p>

Ensure waste disposal procedures are followed.	<p>Front desk and work site waste is disposed of using appropriate sustainable procedures.</p> <p>Front desk and work site waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Front desk and work site waste is disposed of in a safe manner without posing risks to third parties.</p> <p>Front desk and work site is cleaned and cleared of debris and unwanted materials.</p> <p>Rubbish is deposited in designated rubbish disposal bins, and according to regulatory specifications.</p>
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Evidence guide

Overview of assessment	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:	Front desk/worksite located in the front lobby of a hotel, resort or other form of tourism accommodation; majority of work indoor but may be outdoor; clean-up protection; dust management techniques; noise management techniques; front desk/worksite visitors, guests and clients.
Tools and equipment may include:	Resource requirements may include: computer software; environmentally friendly stationary; software reference documentation; reference texts ; consumables; computer; printing equipment; printing cartridges; inks.
Thai regulations, compliance, information and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise, waste disposal/reprocessing, handling of dangerous goods/hazardous substances and other environmental protection issues; relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce use of non-renewable resources; improve energy efficiency; increase use of renewable, recyclable, reusable, and recoverable resources.
Information/documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise, waste disposal/reprocessing, handling of dangerous chemicals/cleaning substances; other environmental protection issues; relevant Thai legislation, regulations, and related documentation.

Unit: (5) To be determined.

Unit Code: To be determined.

Title and definition: Green traditional Thai masseur.

According to the Thai National Skills Standards, a Thai massager is a person who has competency in relaxant massage or foot massage, according to the code of ethics and morals of *nuad* Thai practitioners or traditional Thai massagers. To become a traditional Thai green masseur, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green Thai masseur in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainability workplace processes and reporting as required.</p> <p>Able to follow and apply instructions from clients, work site managers, and supervisors, in relation to sustainability.</p> <p>Can understand, interpret, and apply sustainable environmental information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and cordial manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to managers and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, massage oils, tools, and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs, and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery and tools) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resources use to minimize the effects of pollution in the workplace and adjoining areas.	<p>The massage clinic's environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to that the front massage clinic's equipment and materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean massage clinic environment is present.</p> <p>Massage equipment is operated efficiently to minimize pollution and potential damage to the environment.</p> <p>Unnecessary running of equipment is avoided to minimize energy usage.</p> <p>The massage clinic is kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>The massage clinic's processes are followed, to ensure compliance.</p> <p>Sustainable materials and equipment are purchased according to regulations and instructions by the massage clinic manager.</p> <p>Material and equipment quantity requirements are used in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Seek opportunities to improve resource use, efficiency, and workplace sustainability.	<p>Suggestions and ideas are shared for improvements to the massage clinic's practices in own work area.</p> <p>The massage clinic's efforts to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt the massage clinic's policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting the massage clinic's resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning and maintenance of the massage clinic.</p> <p>Check that the massage clinic equipment is clean and in safe working condition before use.</p> <p>The massage cleaning equipment is cleaned and maintained to meet hygiene requirements.</p>
Ensure waste disposal procedures are followed.	<p>Massage clinic waste is disposed of using appropriate sustainable procedures.</p> <p>Massage clinic waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Massage clinic waste is disposed of in a safe manner without posing risks to third parties.</p> <p>The massage clinic is cleaned and cleared of debris and unwanted materials.</p> <p>Rubbish is deposited in designated rubbish disposal bins, and according to regulatory specifications.</p>

Evidence guide

Overview of assessment.	A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.
Method of assessment.	Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
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Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:	Massage clinic is located in a hotel, resort, or other form of tourism accommodation; the majority of work indoors, but may be outdoors; clean-up protection; dust management techniques; noise management techniques; and concern for guests and clients.
Tools and equipment may include:	Resource requirements may include massage oils; massage tables, massage tables, linen, towels, robes, etc.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise, waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous chemicals and cleaning substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Unit: (6) To be determined.

Unit Code: To be determined.

Title and definition: Green bartender.

According to the Thai National Skills Standards, a bartender is an individual assigned to prepare and mix beverages for customers in the service and beverages business. To become a green bartender, the person will have cognition and ability in this sustainable green competency.

Description

Unit descriptor	This unit of competency specifies the outcomes required to work as a green bartender in the tourism and hospitality industry. It specifies the outcomes required to participate in green environmental sustainable work practices, and addresses environmental and resource efficiency uses. It is aimed at transitioning the Thai tourism and hospitality industry towards a green industry. This set of green sustainable skills must be applied in accordance with relevant Thai legislative and industry standards.
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Employability skills

Communication	<p>Makes suggestions for improved sustainable workplace processes, and reporting as required.</p> <p>Able to follow and apply instructions from clients, bar managers, and supervisors in relation to sustainability.</p> <p>Can understand, interpret, and apply sustainable environment information, requirements, and principles as directed.</p> <p>Understands organizational policies and procedures in relation to environmental sustainability.</p> <p>Reports and records environmental workplace hazards and risks.</p>
Teamwork	<p>Works effectively as part of a team, and provides assistance and encouragement to other team members.</p> <p>Identifies and utilizes the strengths of other team members.</p> <p>Relates to people from diverse social, cultural, and ethnic backgrounds in a respectful and friendly manner.</p> <p>Participates positively in on-site meetings, making suggestions for workplace improvements.</p>
Problem-solving	<p>Examines tools and equipment before use for damage, missing components, or other defects.</p> <p>Identifies sustainable procedural faults and workplace problems, and takes appropriate action and reports to manager s and supervisors.</p>
Initiative and enterprise	<p>Responds positively to workplace changes and challenges.</p> <p>Identifies opportunities, and maximizes the use of resources by recycling, reusing, or using appropriate disposal methods, and puts sustainable workplace suggestions into action.</p>
Planning and organizing	<p>Identifies environmental workplace hazards and risks, and implements appropriate hazard control measures.</p> <p>Chooses appropriate materials, alcoholic and non-alcoholic drinks, and tools and equipment that minimize environmental hazards and maximize efficiency.</p> <p>Determines material quantity requirements and conformity to environmental standards.</p> <p>Applies correct time management skills to ensure satisfactory work completion, and prioritizes and sequences tasks.</p>
Self-management	<p>Evaluates and manages own performance to meet sustainable workplace standards.</p> <p>Requests support and direction to ensure environmental efficiency.</p> <p>Cleans up work areas, including tools and equipment, according to instructions and specifications.</p>
Learning	<p>Identifies own learning needs, and seeks skills development as required, and has a positive attitude to learning new ideas, procedures, and techniques related to environmental sustainability.</p>
Technology	<p>Uses technology efficiently, and implements new technologies in the workplace (including machinery and tools) to ensure environmental efficiency.</p>

Elements and performance criteria

Identify current workplace resource use to minimize the effects of pollution in the workplace and adjoining areas.	<p>Bar area's environmental and resource efficiency issues are identified.</p> <p>Precautions are taken to ensure that the bar's equipment and materials do not pollute the work environment and adjoining areas.</p> <p>Routine checks are conducted or organized to ensure a clean bar environment is present.</p> <p>Bar's equipment is operated efficiently to minimize pollution and potential damage to the environment.</p> <p>Unnecessary running of equipment is avoided to minimize energy use in the bar.</p> <p>Bar is kept clean and tidy during work operations, and the disposal of waste is in accordance with environmental regulations and workplace procedures.</p>
Comply with Thai regulations and prepare for work following green environment conventions.	<p>Bar establishment processes are followed to ensure compliance.</p> <p>Sustainable materials and equipment are purchased according to regulations and instructions by the bar establishment manager.</p> <p>Materials and equipment quantity requirements are used in accordance with sustainability plans and specifications.</p> <p>Sustainable environmental requirements are identified and applied according to Thai statutory and regulatory authority standards.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Suggestions and ideas are shared for improvements to the bar establishment's practices in own work area.</p> <p>Bar establishment's practices to improve environmental practices and resource efficiency are followed.</p> <p>Meetings are held on a regular basis to adopt the bar establishment's policies to minimize and mitigate damage to the environment.</p> <p>Resources are used in a sustainable and responsible manner, minimizing waste and pollution.</p> <p>Appropriate practices are used in measuring and documenting the bar establishment's resources.</p> <p>Identification and reporting of environmental hazards to supervisors and appropriate authorities.</p>
Ensure clean-up procedures are correctly adhered to.	<p>Select environmentally sustainable equipment for cleaning and maintenance of the bar establishment.</p> <p>Check that the bar establishment's equipment is clean and in safe working condition before use.</p> <p>Cleaning equipment is cleaned and maintained to meet hygiene requirements.</p>

Ensure waste disposal procedures are followed.	<p>Bar establishment waste is disposed of using appropriate sustainable procedures.</p> <p>Bar establishment waste is disposed of in a manner that minimizes environmental damage or is neutral to the environment.</p> <p>Bar establishment waste is disposed of in a safe manner without posing risks to third parties.</p> <p>Bar establishment is cleaned and cleared of debris and unwanted materials.</p> <p>Rubbish is deposited in designated rubbish disposal bins, and according to regulatory specifications.</p>
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Evidence guide

Overview of assessment.	<p>A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given, and to participate in the improvement of environmental and resource-efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role. This unit of competency could be assessed in the workplace or a close simulation of the workplace environment.</p>
Method of assessment.	<p>Assessment should occur through appropriately simulated activities at the registered training organization, or in an appropriate range of situations in the workplace.</p>

Required skills and knowledge

Required knowledge

Preservation and restoration of environmental quality

- Basic knowledge of how to best reduce consumption of energy and raw materials in the workplace.
 - Basic knowledge on procedures to limit greenhouse gas emissions in the workplace.
 - Basic knowledge on how best to minimize waste and pollution in the workplace.
 - Basic knowledge on procedures to protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Knowledge of Thai laws and regulations relevant to the work context.
 - Site layout, including location of rubbish disposal bins, is clearly understood.
 - Application of relevant environmental protection regulations and requirements.
 - Knowledge of environmental and resource hazards and risks, and inefficiencies associated with own workplace.
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Mitigation and adaptation

- Workplace procedures and guidelines for the care of the environment at work.
 - Environmental risks and protection standards are adhered to when carrying out workplace operations.
 - Procedures and processes for waste and effluent regulation where applicable.
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Required skills

Preservation and restoration of environmental quality

- Able to adopt basic procedures that reduce consumption of energy and raw materials in the workplace.
 - Able to identify and implement procedures that limit greenhouse gas emissions in the workplace.
 - Able to identify and implement procedures that minimize waste and pollution in the workplace.
 - Able to identify and implement procedures that protect and restore ecosystems in the workplace, if applicable.
-

Decent work

- Communicate effectively to recognize procedures, follow instructions, and respond to changes.
 - Work collaboratively with others when caring for the environment.
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Mitigation and adaptation

- Promptly report and rectify any identified problems that may arise when caring for the environment, in accordance with regulatory requirements and workplace procedures.
 - Implement contingency plans for unanticipated situations that may occur when caring for the environment.
 - Recognize potential pollution risks, and ways of minimizing them.
 - Follow routine service and maintenance procedures for equipment and vehicles.
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Range statement

Workplace environmental resource issues and requirements may include:	Bar establishment is located in a hotel, resort, pub, café, or similar location; majority of work indoors, but may be outdoors; clean-up protection; dust management techniques; noise management techniques; and concern for guests and clients.
Tools and equipment may include:	Equipment may include shakers jugs, standard and specialized cocktail glassware, stirrers and swizzles, blenders, ice crushers, glass chillers, ice shavers, glass ware, cleaning equipment, bar towels, and toothpicks.
Thai regulations, compliance, information, and documents include:	Thai OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous goods and hazardous substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.
Suggestions may include ideas that help to:	Prevent and minimize risks, and maximize opportunities such as usage of solar or other alternative forms of energy where appropriate; reduce emissions of greenhouse gases; reduce the use of non-renewable resources; improve energy efficiency; and increase the use of renewable, recyclable, reusable, and recoverable resources.
Information and documents may include:	OH&S and environmental protection regulations; workplace procedures and policies; codes of practice for environmental protection; material safety data sheets; regulations and policies concerning noise; waste disposal and reprocessing; handling of dangerous chemicals and cleaning substances; other environmental protection issues; and relevant Thai legislation, regulations, and related documentation.

Skills needs in emerging green jobs in the building and tourism industries in Thailand

This study identifies skills needs and gaps in the construction and tourism industries in Thailand, with a view to transforming jobs in these industries into green jobs. Current skills and training systems were reviewed and analysed to see whether the skills and competency standards has green jobs components. The study proposes skills for green jobs responses as well as provides recommendations on integrating green skills and green job components into Thailand's skills and competency standards for selected priority occupations in construction and tourism.

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DECENT WORK

A better world starts here.

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